

Includes PCjrWORLD

PC WORLD

August 1984

\$3.00

\$3.75 Canada

*The Comprehensive Guide to
IBM Personal Computers and Compatibles*

The Boom in Business Graphics

The PC in Politics

San Francisco Mayor
Dianne Feinstein

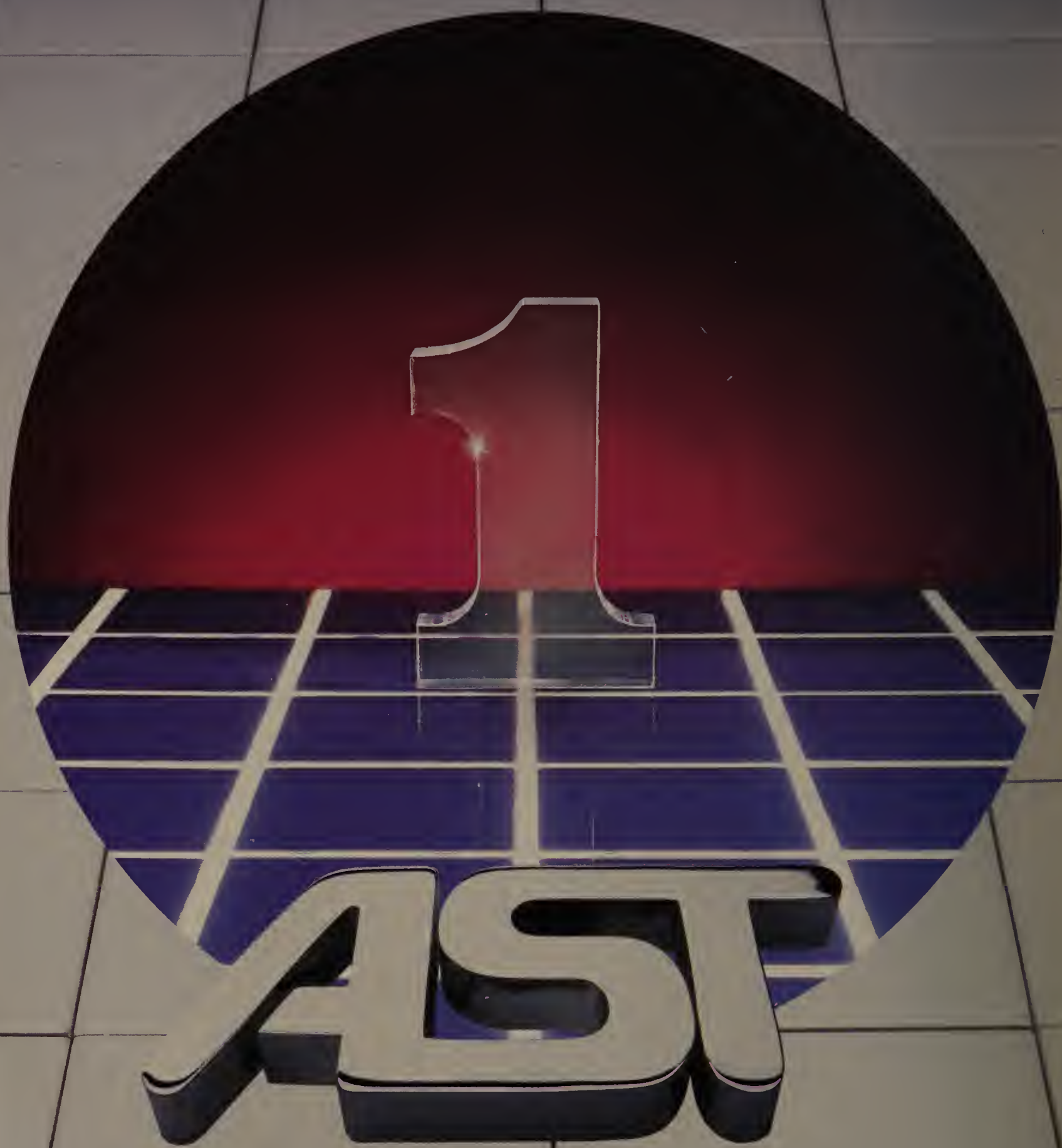
First Look:
Compaq's New
Desktop Computer

Getting Started with
Spreadsheets

High-Quality Plotters

Instant Slides from
Your PC Screen

Interactive Video
Training on the PC
and the PCjr



AST brings you the perfect 4-5-6 for your LotusTM 1-2-3.



Introducing the MonoGraphPlusTM Graphics Card.

Lotus 1-2-3TM is probably the most-used productivity software around. The trouble is, you can't display 1-2-3 graphs on your IBM monochrome display.

That's why AST developed MonoGraphPlusTM for the IBM PC and XT. It replaces IBM's monochrome card, permitting high-resolution bit-mapped graphics and text on the monochrome display.

But our MonoGraphPlus gives you much more.

While Lotus offers three useful programs (1-2-3) in one software package, MonoGraphPlus gives you three additional hardware features (4-5-6) on a single card: a printer port, a serial port, and a real-time clock-calendar. Our comprehensive documentation will even show you how to get an extra two lines of text on your screen.

So now you can produce high-resolution, flicker-free graphics without giving up the high-quality text display that

makes IBM's green monitor so popular. You can also expand your PC's memory with our MP series of memory cards, turning your PC into an even more powerful workstation capable of producing very large spreadsheets with instant charts and graphs.

Leave it to AST to offer yet another state-of-the-art enhancement product for the PC. You see, we're the world's leading supplier of enhancement products for the IBM PC, offering a complete family of multifunction cards, communications emulators, and local area network products.

To get the perfect 4-5-6 for your PC see your local computer retailer, or contact AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333.

TWX: 753699ASTR UR

IBM is a trademark of International Business Machines Corp. Lotus and 1-2-3 are trademarks of Lotus Development. MonoGraphPlus is a trademark of AST Research, Inc.



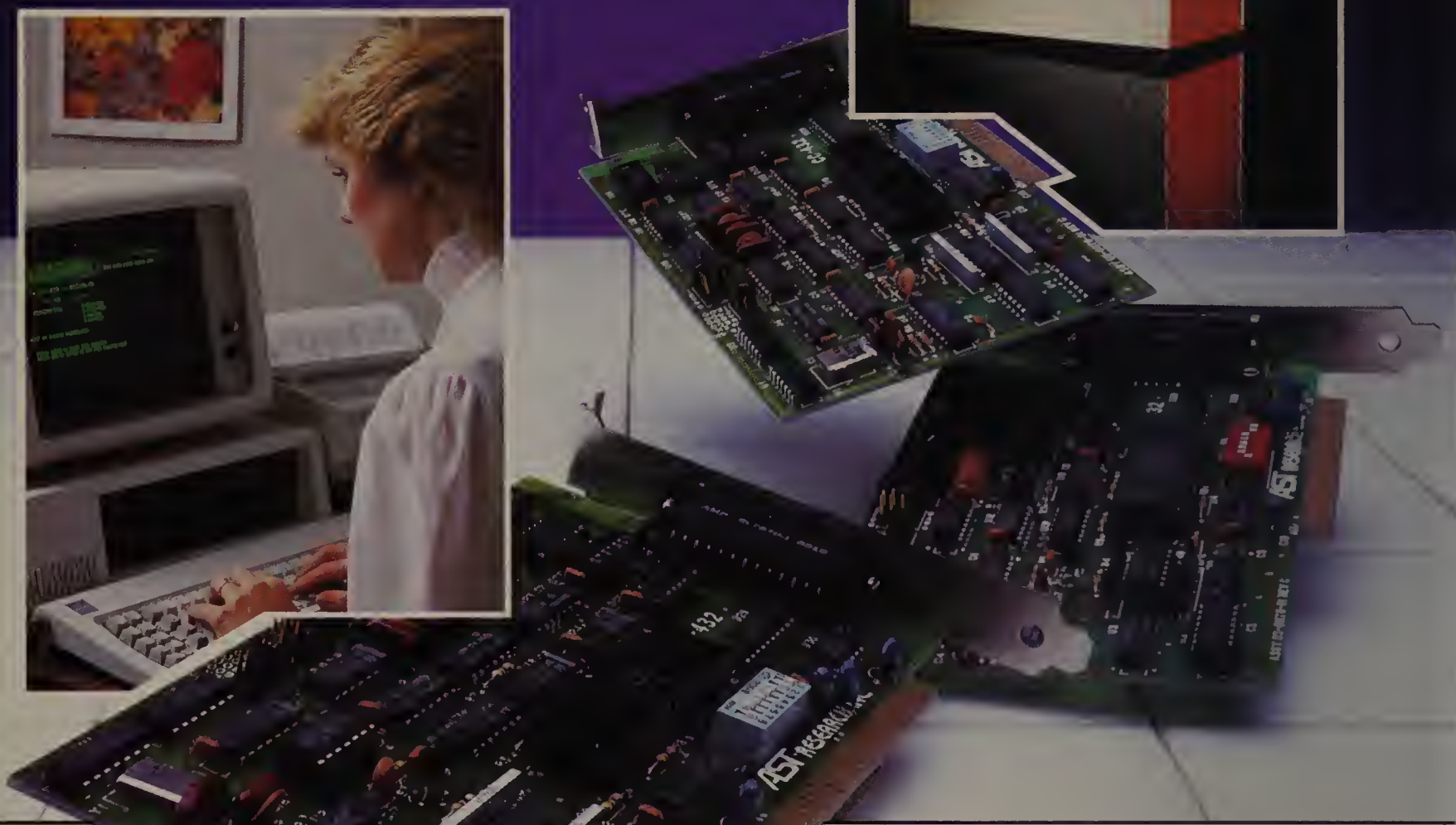
RESEARCH INC.

MonoGraphPlus Graphics Card

Circle 18 on reader service card



Now You Can Use Your IBM PCs as Smarter Smart Terminals in the IBM3270 World.



More and more, people in your company want to access data from the mainframe. And since IBM PCs are in (while dumb terminals are on their way out), you need one good source for a complete family of micro-to-mainframe communications products.

That's where we come in. AST is the leading supplier of IBM PC-compatible products. With over 200,000 board-level PC enhancements already on the job. And now we're offering a full line of 3270-compatible products that will fit a variety of connections and protocols. Without forcing you to reconfigure your mainframe hardware or software. For starters, there's our new AST-SNA family. Hardware and software that let your PCs talk to your mainframe (and let the mainframe talk back) via the SNA/SDLC protocol. Giving you all the facilities of a 3270 terminal. And with the computing power of your stand-alone PC maintained!

Plus, the basic hardware can support multiple protocols. And

you can support a variety of emulations from a single PC. Or support additional PCs by using one as a cluster controller. An arrangement (with up to four PCs) that can save you a lot of money. You can even attach low-cost ASCII CRTs to a PC and emulate 3278 Model 2s.

What's more, our AST-BSC package lets you work in a 3270 BSC environment and still migrate to 3270 SNA/SDLC without hardware upgrades. Another way to save money and aggravation.

Still, there's more. For example, if you have an IBM 3274/3276 Cluster Controller, our coaxial connection hardware is your answer. Once installed (via coax-A), it lets your PC retain its stand-alone processing capabilities

and emulate a 3278/9 terminal. With no performance degradation! You can even use our AST-3780 to support 3780 RJE batch communications. Which gives your PC the ability to operate unattended. And transfer program, data or text files between your PCs and an IBM host at very high speeds.

AST is the only supplier that can give you a complete line of PC-compatible products. Communications hardware and software for 3270, 3780 and 5251 environments. I/O and memory expansion cards. And utility programs.

Find out how thousands of users have benefited from AST's communications products. To get detailed product and configuration data, call us today at (714) 863-1333. Or write AST Research, 2121 Alton Avenue, Irvine, CA 92714. TWX: 753699ASTR UR.



AST RESEARCH INC.

IBM PC is registered trademark of IBM Corp. AST-3780 a product developed by AST Research, Inc. and Wilmot Systems, Inc.

Introducing AST-PCnet II.



Now PC networking is as easy as plugging-in your phone.

The advantages of Local Area Networks (LANs) are well known. Existing personal computers can be tied together to share information and expensive peripherals such as disks and printers.

Now AST makes networking easier and more economical than ever before. With AST-

PCnet II, you simply insert the PCnet II board into an I/O slot in your IBM PC or XT. Then connect the PCnet II "twisted-pair" cable to the main network cable using a standard modular "telephone jack."

The same kind of jack that's used on your telephone. To move your PC from one point to another on the network, simply plug in at the desired location. It's that easy.

With AST-PCnet II, anywhere from 2 to 160 PCs can be interconnected. Standard PC-DOS commands are used to access remote drives and printers. And dedicated file and print servers are not required, because shared PCs also function as standard workstations.

We're AST, the world's leader in communications and enhancement products for the IBM PC. To find out how AST-PCnet II can expand your IBM PCs and

XTs into a reliable, versatile LAN, call or write AST Research, 2121 Alton Avenue, Irvine, California 92714.

(714) 863-1333. TWX: 753699ASTR UR

AST PCnet II is a development of AST Research Inc. Software protocols are based on technology licensed from Orchid Technology Inc.

AST

RESEARCH INC.



AST-PCnet II Local Area Network

Get yourself a

This little critter comes with specially-designed software that flies through the maze of keystrokes on the most popular business programs faster than you can say "cheese."

Microsoft® Mouse puts the power to run Multiplan®, Lotus 1-2-3™, VisiCalc® and WordStar® in the palm

of your hand. Click the left button on the mouse, a custom menu appears. In English, not hieroglyphics. Click the right button and execute your command: move text or data, edit, format, print. All at blinding speed without touching the keyboard.

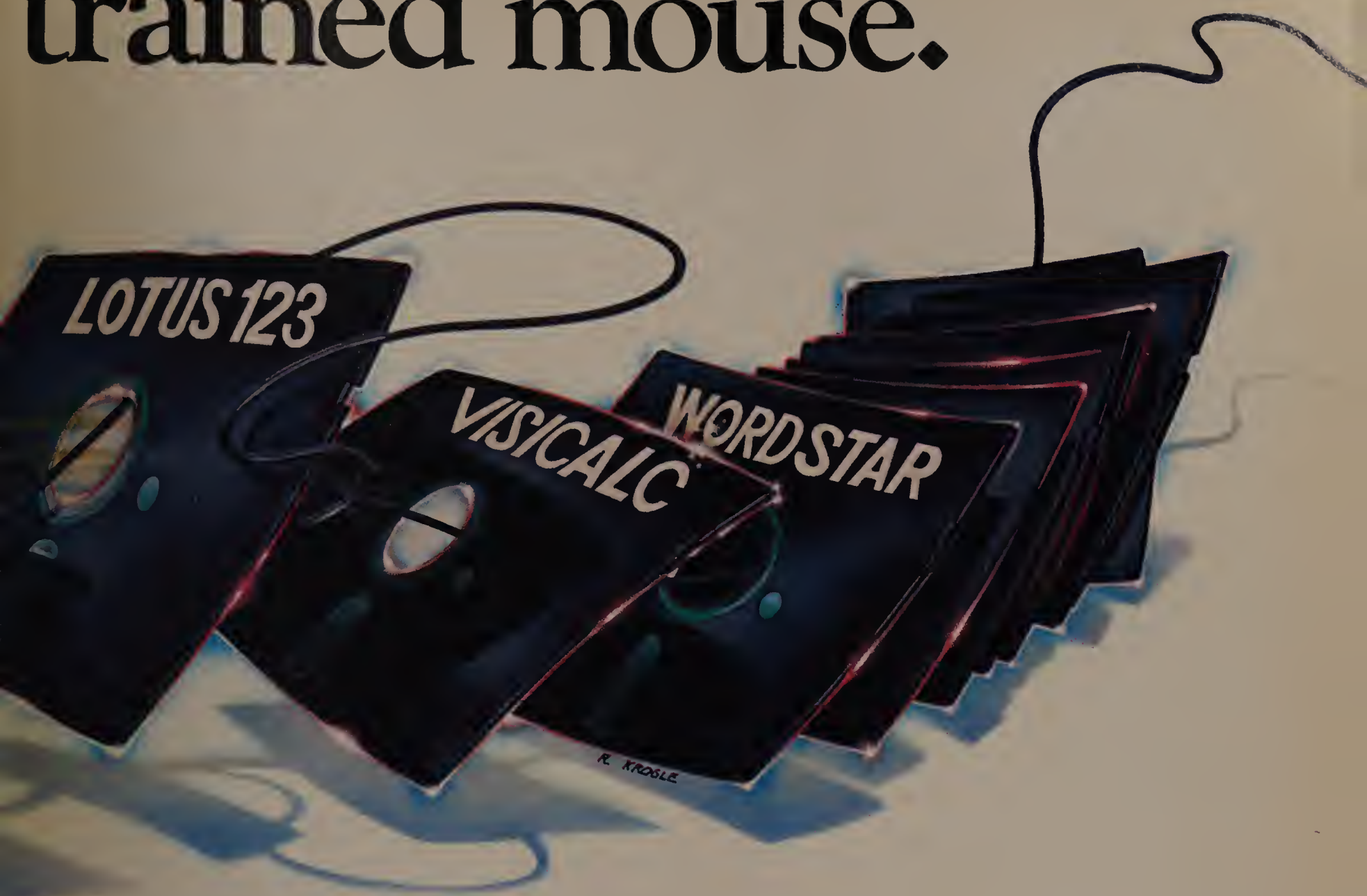
It also lets you create your own menus for editing and formatting existing application programs. So people can learn programs quicker and do more productive work as they learn.

The mightiest mouse.

Microsoft Mouse runs circles around other mice. It is the high performance mouse for the IBM® PC and PC XT. From the company known for high



trained mouse.



performance software. Microsoft BASIC is the language spoken by nine out of ten microcomputers worldwide.

MICROSOFT
The High Performance Software

Our MS[™]-DOS operating system tells your IBM PC how to think.

So don't monkey around with any other mouse. Call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer. Then go with Microsoft Mouse. The mouse that soars.

A close-up of a hand holding a large, dark, three-dimensional block letter 'M'. The letter is being held from the bottom right corner, with the thumb and index finger visible. The letter is part of the word 'MICROSOFT', which is partially visible in the background.

Microsoft and Multiplan are registered trademarks and MS is a trademark of Microsoft Corporation. Lotus 1-2-3 is a trademark of Lotus Development Corporation. VisiCalc is a registered trademark of VisiCorp. WordStar is a registered trademark of MicroPro. IBM is a registered trademark of International Business Machines Corporation.

David Bunnell
Publisher

Andrew Fluegelman
Editor-in-Chief

Jacqueline Poitier
Associate Publisher, Art & Production

Cheryl Woodard
Associate Publisher, Circulation

Harry Miller
Editor

Editorial

Associate Editor: Robert Luhn
Technical Editor: Karl Koessel
Assistant Editors: Eric Brown, Ken Greenberg, Katie Seger
Product Review Editor: Christine Whyte
Editorial Mgr.: Cindy Hamburger
Special Editions Mgr.: Reed McManus
Editorial Assistant: J. Schaffner
Senior Copy Editor: Tema Goodwin
Copy Editors: Kathleen Christensen, Darcy DiNucci, Joe Matazzoni, Peggy Naufs
Contributing Editors: Burton L. Alpersen, Keith Richard Cook, Steven Cook, Eddie Currie, Danny Goodman, Larry Jordan, Lawrence J. Magid, Janette Martin, Seth Novogrodsky, Gene Plantz, Larry Press, Stuart R. Schwartz, Merrily Shinyeda, Andrew T. Williams

PC World Books

Editor: Jeremy Joan Hewes
Senior Editorial Mgr.: Betsy Dileria
Assistant Editor: Lindy Wankoff

Art & Production

Senior Production Mgr.: Frances Mann
Production Mgr.: Lee R. Trevino
Designer: Margie Spiegelman
Associate Designers: Dennis McLeod, Monica Thorsnes
Art Director: Mick Wiggins
Design Associates: Darcy Blake, Donna Sharee, Molly Windsor-McLeod
Assistant to the Art Director: Nan Cassady
Editorial Production Mgr.: Ellyn L. Hament

Editorial Production Assistant: James Felici
Ad Traffic Coordinator: Clare Bouey
Telecommunicators: Eugene F. Catalano, Mark L. Duran, Susan M. Ford

Advertising Sales

Director: Roderick B. Conklin
Account Mgrs.: Rich Arzaga, Linda Crawford, J. Mark Doss, Patricia Navone, Meredith Powers
Action Ad/Directory Sales Reps.: Niki Stranz, Carol Watson
Marketing Services: Charles Abrams, Rodney Brooks

Circulation

Subscriptions
Director: Carma Winfrey-Hayes
Services Coordinator: Lorrie Poch
Promotion Coordinator: Laurie King
Corporate Sales: MaryAnn DePietro
Marketing Assistant: Jayne Boyer
Single Copy Sales
Director: George Clark
Single Copy Sales Mgr.: William B. Cox
Dealer Sales Mgr.: Mary Ruth Kristoff
Account Mgrs.: Christopher Clarke, Elaine McMahon, Jo Muilenburg

Special Projects

Director: Susan R. Keller
Publishing Assistant: Karen G. Dowell

Communications

Manager: Noreen A. Browning

Administration

Director: Janet D. McGinnis
Personnel Mgr.: Sarah Cox
Accounting Mgr.: Pat Murphy
Facilities Mgr.: Joseph Wollenweber

Corporate
PC World Communications, Inc.

David Bunnell
Chairman

Bartlett R. Rhoades
President

Andrew Fluegelman
Vice President

Jacqueline Poitier
Vice President

Cheryl Woodard
Vice President

PC World™ (ISSN 0737-8939) is published monthly except semimonthly in June and December at \$24 for one year (14 issues), \$43 for two years (28 issues), \$60 for three years (42 issues) by PC World Communications, Inc., 555 De Haro St., San Francisco, CA 94107. Additional postage outside the US and Canada \$25 per year surface mail, \$110 per year airmail. For questions regarding subscriptions and to place subscription orders call toll-free 800/247-5470 (in Iowa: 800/532-1272). Second-class postage paid at San Francisco and at additional mail offices. POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 6700, Bergenfield, NJ 07621. Editorial and Business Offices: 555 De Haro St., San Francisco, CA 94107, 415/861-3861.
CompuServe 74055,412
The Source STE908

PC World™ is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Entire contents Copyright 1984, PC World Communications, Inc. All rights reserved. The following are trademarks of PC World Communications, Inc.: PC World View, *, *, PC World. PC World™ is a member of the CW Communications, Inc., group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the publication group include Argentina: *Computerworld/Argentina*; Australia: *Australia Computerworld*, *Australian MicroComputer Magazine*, *Australian PC World* and *Directories*; Brazil: *DataNews*, *MicroMundo*; China: *China Computerworld*; Denmark: *Computerworld/Danmark*, *MicroVerden*; Finland: *Mikro*; France: *Le Monde Informatique*, *Golden (Apple)*, *OPC (IBM)*; Germany: *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *Software Market*, *CW Edition/Seminar*, *Computer Business*, *Commodore Magazine*; Italy: *Computerworld Italia*; Japan: *Computerworld Japan*, *Perso ComWorld*; Mexico: *Computerworld/Mexico*, *CompuMundo*; Netherlands: *CW Benelux*, *MicroInfo*; Norway: *Computerworld Norge*, *MikroData*; Saudi Arabia: *Saudi Computerworld*; Singapore: *The Asian Computerworld*; Spain: *Computerworld/España*, *MicroSistemas*; Sweden: *ComputerSweden*, *MikroDatorn*, *Min Hemdator*; United Kingdom: *Computer Management*, *Computer Business Europe*; United States: *Computerworld*, *Hot CoCo*, *Incider*, *InfoWorld, jr.*, *Macworld*, *MICRO MARKET-WORLD*, *Microcomputing*, *PC World*, *PCjr World*, *Run*, *73 Magazine*, *80-Micro*.
Printed in the United States of America.

Manufacturers wishing to have their products reviewed should contact:
Product Review Editor
PC World
555 De Haro St.
San Francisco, CA 94107
415/861-3861

Learn to use your computer the way you learned to ride a bike.

Your first time was scary.
But you caught on fast, with a little
support from someone you trusted.
Remember?

That's exactly the way ATI
teaches you to use your computer
and software.

Insert the disk, and you're
practicing real computer skills
immediately. The ATI program
guides you, step by step, simulat-
ing the actual program.

Our method is faster be-
cause you learn by doing, interact-
ing with the screen. Our unique
split screen approach lets you
learn in half the time of any other training program. That's why we're
the choice for many Fortune 500 companies and have sold over 100,000
programs to date.

ATI has training disks and handbooks for most of the
popular software programs and computers.

Before you know it, using your computer will be as
natural as riding a bike. Ask for ATI at your computer store. Or, use
this coupon to order by mail.



Please rush me ATI
Training Power™
programs, at \$75
each for this software:

Integrated Software
☐ Lotus 1-2-3
☐ SuperCalc®

Database Management
☐ dBASE II
☐ EasyFile

Word Processing
☐ WordStar
☐ EasyWriter II
☐ Perfect Writer
☐ Spellbinder
☐ Microsoft Word
☐ MultiMate

Financial Planning

- ☐ Multiplan
- ☐ SuperCalc
- ☐ VisiCalc
- ☐ Perfect Calc
- ☐ EasyPlanner
- ☐ Microplan
- ☐ TK! Solver
- ☐ PeachCalc

Programming

- ☐ BASIC
- ☐ APPLESOFT BASIC

Accounting

- ☐ IBM Gen. Acct.
- ☐ Peachtree General Ledger®
- ☐ Peachtree Accounts Receivable®
- ☐ Peachtree Accounts Payable®

*PC (MS) DOS
formats only

Operating Systems

- ☐ PC DOS
- ☐ MS DOS
- ☐ CP/M

How to Use

- ☐ How to Use Your IBM PC
- ☐ How to Use Your COMPAQ
- ☐ How to Use PC jr.
- ☐ How to Use Your
TI Professional
- ☐ How to Use Your Macintosh
- ☐ How to Use Your Apple IIe

PCW

My computer uses:

- ☐ PG-DOS
- ☐ XENIX
- ☐ MS DOS
- ☐ APPLE II CP/M
- ☐ CP/M
- ☐ APPLE IIe 80 col

Please enclose \$75 each plus \$2.50 for domestic shipping, or \$15 for overseas.
(California residents: add 6.5%)

Name _____

Phone (_____) _____

Street _____

City _____

State _____ Zip _____

Mail order form to:
Software Training Company
A Division of ATI
12638 Beaurice Street
Los Angeles, CA 90066



Dealers:

Call for sales kit
(213) 823-1129
(800) 421-4827
For rush orders call:
(213) 823-1129
(800) 421-4827

ATI Money Back Guarantee
If you're not completely sat-
isfied with how fast you learn
with ATI Interactive Train-
ing Power Programs, simply
return within 3 days for full
purchase refund.

The following names are trademarks of the following companies: ATI Training Power, of American Training International; CP/M, of Digital Research; PC DOS, of IBM; WordStar, of Micropro; Benchmark, of Metasoft; EasyWriter, Easy-
Plan, and EasyPlanner, of Information Unlimited Software; MS DOS, and Multiplan, of Microsoft; dBASE II, of Ashton-Tate; SuperCalc, of Sorbus; VisiCalc, of VisiCorp; Microplan, of Chang Laboratories; PeachCalc, of Peachtree Software;
ATI Training Power, Software Samples, of American Training International; Spellbinder, of Lexiprint; Perfect Writer, and Perfect Calc, of Perfect Software; Lotus, of Lotus Company; of Compaq; PC jr., of IBM; TI Professional, of Texas
Instruments; Hyperion, of Hyperion; Microsoft, of Microsoft; MultiMate, of Software Systems; TK! Solver, of Software Arts.

© 1984 American Training International



ATI Training Programs™

Learn software the natural way.

Circle 7 on reader service card

PC WORLD

*The Comprehensive Guide to
IBM Personal Computers and Compatibles*

● Getting Started

- 54 **The Boom in Business Graphics, *David L. Wilcox***
For presentations, reports, sales demonstrations—whenever you need to make a point effectively and immediately—computer graphics can help your audience get the picture. A look at what business graphics packages offer and tips for selecting the right program.
- 66 **Introduction to Spreadsheets, *Harry Miller***
Any job you can do with calculator, paper, and pencil can be done faster and more easily with an electronic spreadsheet. This primer demystifies spreadsheet terminology, discusses important features, and compares the approaches of different programs.

● State of the Art

- 94 **Compaq Settles Down and Powers Up, *Ken Greenberg***
Compaq's success with its portables has emboldened it to challenge IBM for a place on corporate America's desk tops. Introducing the Deskpro line of full-sized, modular computers.
- 106 **UNIX Tug-of-War, *David W. Smith and Peter Marvit***
It's a battle of the giants as IBM challenges AT&T on the communications colossus's own turf with PC/IX—the UNIX operating system for the PC.

Photollustration credits: David Bishop, 66, 132, 208, 261; Steve Campbell, 182; Michael Carr, 94; Bill Cone, 21; David Johnson, 42, 45; John Littleboy, 106; Ming Louie, 44-45, 117, 216; Stevan Nordstrom, 248; George Steinmetz, cover; Fred Stimson, 294; Mick Wiggins, 200.

● Review

- 132 **Pick of the Plotters, *Akshai K. Runchal, Jacob Treger, and Clement K. Tam***
Three colorful multipen plotters put punch in your presentations. Reviews of the Amplot II, the HP7475 Graphics Plotter, and the Hiplot DMP29.
- 152 **Beyond Bar Charts, *Burton L. Alperson***
Presentation business graphics packages are becoming a necessity in today's offices. *Chart-Master* and *BPS Business Graphics* offer a variety of presentation graph types to drive your point home.
- 168 **More Color Than Big Blue, *David McCune***
Want more pixels for your dollar? The PC Peacock and the Graphics Plus II color graphics boards offer superior resolution, plus more colors and accessories than IBM's monochrome and color graphics boards.

● PCjr World

- 200 **PC + Video: Working Partners, *Katie Seger***
The interactive video technology that made *Dragon's Lair* an arcade smash last year should soon be adding excitement to educational and entertainment programs on the PCjr.
- 208 **Three-Part Harmony, *Warren Sirota***
The PCjr learns to play a sixteenth-century dance while you learn about Cartridge BASIC's PLAY statement and three-voice programming.
- 216 **Plug In More Power, *Katie Seger***
This tutorial lays out the steps for adding an expansion board and a disk drive to the PCjr.

August 1984

● Hands On

- 230 **Media Conversion**, *Janette Martin*
Before you get the conversion blues, explore the alternatives for moving your data over to the PC—service bureaus, telecommunications, disk conversion devices, and digitizing cameras.
- 242 **CP/M to DOS**, *Steven D. Ryals*
An Osborne owner tells how he converted to the Compaq with the help of Perfect Software's *Perfect Link*.
- 248 **Professional Presentations**, *Bill Crider*
Stage fright during business presentations can be cured with planning and common sense. A few guidelines for a fail-safe presentation.
- 261 **60-Second Slides**, *Cindy Hamburger*
Want to make presentation-quality slides of your computer screen? With the Palette, Polaroid brings its prescription for immediate gratification to the computing world.
- 271 **1-2-3 Graphics Made Easy**, *Joseph P. Celentano*
You can produce surprisingly sophisticated graphics with software you already own. Learn to use 1-2-3's graphics functions.

● Community

- 294 **The New Political Machine**, *Jonathan Littman*
Necessity and new software have brought the microcomputer into yet another arena—the political. The PC's tireless list-management, budget-crunching, and data manipulation abilities are making it the most popular political organizer of Campaign '84. Also an interview with San Francisco Mayor Dianne Feinstein.

- 311 **Totally Unwarranted**, *Phillip Gordon*
The disclaimers on many software packages may sound like they leave you out on a limb legally, but software manufacturers and retailers can't always avoid responsibility for their products. Find out what your rights are when the software you buy doesn't live up to its promises.

Departments

- 13 **David Bunnell**
Psychological software.
- 21 **REMark**, *Robert H. Glidden*
Outlook for software independents.
- 31 **Letters**
- 42 **PC World View**, *Miriam Medom and Katie Seger*
News and notes for the computing community.
- 81 **The Help Screen**, *Karl Koessel*
Your PC enigmas unraveled.
- 116 **Compatibles Update**, *Ken Greenberg*
News from the world of PC work-alikes.
- 182 **From the Software Shelf**, *Edited by Robert Luhn*
First impressions of recently released software products.
- 280 ***.***, *Edited by Steven Cook*
A global exchange of personal computer discoveries.
- 342 **Just Announced**, *Edited by J. Schaffner*
The wide world of IBM PC products.

Indexes

- 356 **Advertisers**
358 **Products**

The new IBM DisplayWrite



Little Tramp character licensed by Bubbles Inc., s.a.

*Prices apply at IBM Product Centers and may vary at other stores.

**Available in July, 1984.

Series is here. Spread the word.

In 1980, IBM introduced the Displaywriter System. Today, it's become the best-selling stand-alone text processor in the world. One reason for this success is the Displaywriter's function-rich software.

If you're looking for software like that, but working on an IBM personal computer, you don't have to look any further. Because the IBM DisplayWrite Series is here.

And it will put many of the features and capabilities of a dedicated word processor to work for you when you're writing.

It runs in the family.

You'll find two word processing programs in this series: There's DisplayWrite 1, for IBM personal computers—including PCjr. And DisplayWrite 2, with added functions for your PC, PC/XT or *Portable* PC.

You'll also find DisplayWrite Legal, a dictionary of about 16,000 words that a lawyer might need to check.

And you'll find DisplayComm, which lets your IBM PC send and receive text to and from other IBM PCs. If you're writing at the office, this program could also let you send text to an IBM Displaywriter down the hall. (From there, it could be sent on to an IBM host computer for distribution.)

Some words on high function.

The DisplayWrite word processing programs give you the time-saving features you'd expect from IBM. Justified margins, centered lines and pagination, for example. You'll even have prompts and messages to help guide you along.

But there are also some features in DisplayWrite 2 you might not expect. Like easy column formatting, four-function math capability *plus* a spelling checker based on a dictionary of about 100,000 words.

Yet the biggest surprise of all may be the price.* DisplayWrite 1,** \$95. DisplayWrite 2, \$299. DisplayWrite Legal, \$165. DisplayComm, \$375.

Where you can find all four.

Get more information about the IBM DisplayWrite Series at your authorized IBM Personal Computer dealer or IBM Product Center. To find one near you, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

Stop there first and get the last word.



Personal Computer Software

For the first time, you can get
three types of computer
communications systems from
just one company. Quadram.



Now Quadram Makes Communications as easy as 1, 2, 3.

When it comes to enhancement products for IBM® PCs and other personal computers, no one can beat Quadram. In fact, if you use spreadsheets or large databases, you're probably using a Quadram product already.

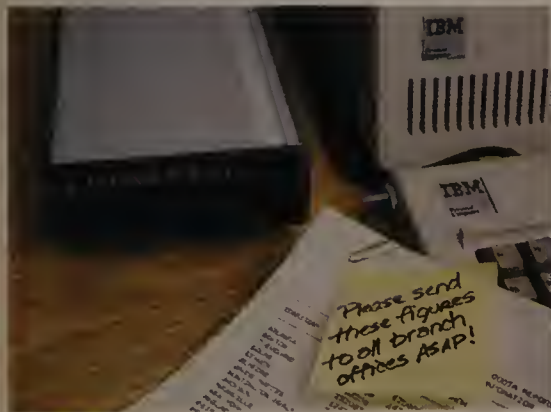
Now Quadram applies their expertise to communication devices. Not just modems, but a full range of other products, too. So that you can do anything from networking many PC's together to giving your PC full 3278 terminal emulation in an IBM mainframe environment.

Only Quadram gives you such a selection—complete with options and upgrade capability. So now it's easier for you to design the perfect system for your needs. All you need to do is remember one name—Quadram.

1. Quadmodem.™ From your home or office, reach out and touch something.

Just because your computer is all alone, that doesn't mean it has to be lonely. Not when you've got Quadmodem.

Quadmodem is a complete intelligent modem package, including an integral or standalone modem with supporting documentation. Each modem comes with QuadTalk—a powerful communications software package plus an introductory offer from The Source.™



Just pick the model that's right for you and your computer.

The Integral Unit drops into an IBM PC, XT, PCjr or Apple IIe.

The Stand Alone is an intelligent modem that connects to your system through an RS-232 port.

Both have enhanced diagnostic capability to troubleshoot not only your system, but the

system at the other end of the phone line. And both have call progress monitoring to automatically determine and compensate for different types of phone systems and transmission status (human voice, busy signal, data or dial tones). Of course, both plug directly from your computer into your phone jack.

Get the modems with the name for quality. Quadmodem.™ Fully compatible with Bell 103/212A dial-up modems and the most popular modem brands.

2. Quad3278.™ Let an IBM PC communicate with an IBM mainframe.



To integrate your PC into a mainframe environment, look to Quadram first.

Because now you can have all the features of the IBM PC (mass storage and peripherals) plus the incredible power of a mainframe right at your desk. All it takes is Quadram's 3278 emulation package which includes hardware, software, even cabling.

To make your IBM PC emulate the 3278 Display Work Station, get the Quad3278.™ Once you're on-line the IBM mainframe sees you as just another 3278 terminal. Little does it know that you're actually a high-performance, intelligent work station, with all the functions of the Personal Computer. With mainframe support you can download data, process it on your PC, even store it on your own disk for later reference.

Make the connection from micro to mainframe. And back it up with Quadram quality. It's the logical step for the future.

3. Quadnet.™ Turns your IBM PC's into a Local Area Network.

Local Area Networking (LAN) is one of the most interesting and useful ideas to come

down the pike. Basically, it allows you to inter-link a group of computers together so they can share information and peripherals with each other.



And now with Quadnet, you don't have to compromise your system to fit our system. Instead, you can easily link as few as two, or as many as 255 IBM PC's together in a hard-wired network. And you can configure them almost any way you want. They can work independently of each other or share resources and peripherals.

The possibilities are endless. But the important thing to remember is that Quadnet gives you a choice with four different Network Systems. Choose the one that meets your price and performance needs.

Quadnet grows as you grow. Yet the user commands stay the same, thanks to the upward compatibility of the Quadnet operating software.

Whichever version you hook on to, you get a complete package (hardware, software, and documentation). And most importantly, you get Quadram's reputation for quality.

QUADRAM QUALITY



At Quadram, we don't make personal computers. We just make them better. So insist on the Quadram name. It's your assurance that you're buying from one of the most established and involved

companies in the microcomputer field. Ask your dealer about us.

IBM® PC, XT, PCjr. are registered trademarks of International Business Machines Corporation.

*The Source is a registered trademark of Source Telecomputing Corporation.

APPLE IIe® is a registered trademark of Apple Computers, Inc.

© Copyright 1984 Quadram Corporation. All rights reserved



4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

INTERNATIONAL OFFICES

Interquadram Ltd, 442 Bath Road, Slough, England SL16BB
Tel: 6286-63865 Tlx: 847155 Auriema G Interquadram GmbH
Fasanenweg 7, 6092 Kelsterbach, West Germany Tel: 6107-3089
Tlx: 417770 Seva G Interquadram s.a.r.l. 41, Rue Ybry, 92522 Neuilly
Tel: 758-1240 Tlx: 630842 Iso Bur Chevero Computing 6581 Kitimat
Road, Mississauga, Ontario, Canada L5N-2X5 Tel: 416-821-7600

AT LAST. SOFTWARE SO REVOLUTIONARY IT WON'T CHANGE THE WAY YOU WORK.

Introducing the first software ever designed to work just like people. Instead of the other way around.

It's called Electric Desk™ from Alpha®. And it's the only software you can buy that actually lets you move instantly from one job to another—from a letter to a memo to a budget to a customer list, over to a stock report and back—all with a couple of keystrokes.

Try that with other software and you'll end up switching disks, reading and writing files, switching disks again, waiting, worrying, trying to remember different commands for different software packages. Not very natural.

But with Electric Desk, virtually all the computer power you need—including word processing, spreadsheet, data base and communications—can all be going at the very same time. All from a single program with one set of easy commands.

You can even split your screen into windows and work on two jobs at once. Or shoot information from one file to another in a flash. Not even the most expensive integrated packages work as quickly or as well. And what's best is Electric Desk is so easy to learn and use, many people never even look at the manual.

So take your choice. Go with other software and change the way you work. Or go with Electric Desk and change the amount of work you get done. See it now at your Alpha Software Dealer or call us for more information at 1-800-451-1018 (in Massachusetts call 1-800-462-2016).

Electric Desk—Integrated Productivity Software for the IBM® PC, XT and PCjr.



Electric Desk is a trademark licensed to Alpha Software Corp. by Electric Software, Inc. Alpha Software Corp. is a registered trademark. IBM is a registered trademark of the International Business Machines Corp. © 1984 Alpha Software Corp.

Alpha Software Corporation, Burlington, Massachusetts.

Circle 6 on reader service card



Searching for the Next Generation of Software

At some point in the life of every creative enterprise, it runs up against a wall, and what was once a good idea is battered beyond recognition. Doctors run the same experiments, politicians make the same promises, and programmers design the same software. Although the ideas may differ in practice and presentation, in essence they are all the same. As I consider the wealth of available software, I'm amazed at how boring the personal computer industry threatens to become if the applications remain largely confined to so-called productivity tools.

Word processors, spreadsheets, data base management systems, and communications programs currently dominate the market. They are constantly updated and integrated with each other in endless arrangements. Many new application packages are spin-offs of those already on the market. If the trend toward software sitcoms continues, we will see windows of data within windows of data outside of windows of data. The personal computer will take on many of the dull, repetitive characteristics of television—which would be a shame, since PCs have so much more to offer than “That’s Incredible.”



At a recent personal computer trade show I stopped by the Human Edge booth and tried out a piece of software that answered my prayers for some sign of life after spreadsheets. *The Sales Edge* takes applications software one step further by analyzing data to assist a sales professional in preparing for a presentation to a client (see “Perfect Pitch,” *PCW*, Vol. 2, No. 7).

The program was designed by Dr. James Johnson, a clinical psychologist who left his position as a university lecturer to enter the world of personal computing. As founder of Psych Systems, he originally blended programming and psychology to develop a system to analyze patients. Dr. Johnson is applying the same idea at Human Edge, but it is aimed at an audience less versed in clinical psy-

chology. *The Sales Edge* and *The Management Edge* offer users general strategies to approach sales and business situations.

I tested *The Sales Edge* and found it both easy to use and fast. The program runs through a series of questions about your personality—your likes, dislikes, and typical reactions to certain situations—and then poses a similar set of questions about your intended customer. The system classifies you and your customer into 1 of 12 personality types, whips through a compilation of papers and psychological techniques, and selects a tactical approach tailored to your particular situation.

The question-and-answer session took about 15 minutes. I set up a hypothetical situation that included myself and a friend. To add to the suspense I pretended that we were involved in a gigantic transaction with millions of dollars at stake. The results were printed out instantly, restrained by only the printer’s speed. To my amazement, the program’s suggestions were applicable and sensible. Even if I didn’t plan to follow the program’s advice, it took me through a useful, analytical, and enlightening process.

GATO™



Now YOU step in!

Please send me:

____ Copies of GATO @

____ Poster of GATO @

Tax (CO residents)

POSTAGE: Add \$1.00 per item

Visa or M/C# _____

EXP. _____

Make Checks Payable To: Spectrum HoloByte, Inc.
2006 Broadway, Suite 301,
Boulder CO 80302 (303) 443-0191



\$39.95: = _____

5.95: = _____

4.1%: = _____

Total Pst = _____

TOTAL \$ _____

(OR CHECK AT YOUR LOCAL COMPUTER STORE)

Requires 128K RAM one double-sided disk drive. Color graphics adapter.
IBM personal computer series. (Including PC Junior)

Circle 589 on reader service card

David Bunnell

I'm sure that on many levels the program might be judged superficial and overly general. But it utilizes the PC's ability to sort and find in a new way. The key point is that even if *The Sales Edge* doesn't outsell *1-2-3*, it opens the door to a whole new genre of personal computer applications—just as the Altair provided the gateway to microcomputing. By applying the psychological touch to their programs, software developers can propel personal computing into the first level of artificial intelligence. The logical assessment of data allows the PC to act as an advisor, a thought facilitator, and a personal consultant.

The potential range of applications for this kind of software is remarkable. As a personal consultant, your PC can act as a tax advisor, a marriage counselor, a health administrator, a stockbroker, or a foreign language teacher; its versatility is limited only by your needs and willingness to experiment. When the full potential of the personal computer is revealed, people who don't tap into this resource will be forever hindered. Those who still think personal computers are only a fad will have to think twice. The pendulum of public opinion will inevitably swing back, and people will be afraid to be *without* a personal computer. Once it survives the period of transition and achieves full acceptance into the mainstream, the PC will become a permanent ally to humanity and will constantly expand in utility and creative application.

The addition of this psychological touch to the software field marks the creation of a new generation of programs—a second species, one that many fear is reminiscent of Dr. Frankenstein's monster. The doctor's initial dream dissolved into a nightmare as the creature took on a life of its own. But while we still have control and foresight, we can create genies rather than monsters. The little magical guy in the bottle has moved onto a silicon chip, but it's still up to us to use or misuse him. ●

Introducing the Half Card.TM The only 1200 baud modem for that small space in your IBM XT.

Put a half space to full use.

The Ven-Tel Half Card is an ultra small 1200/300 baud modem that fits into the unused half sized slot in the IBM-XT, leaving the full size slots free for additional memory and other expansion. Although it's half the size of other modems, the Half Card has all of the high performance features you expect: selection of 1200 or 300 baud, automatic dialing, auto-answer, and full compatibility with virtually all software.

The PC Modem Half Card comes complete with one of the most popular communications software packages available, CROSSTALK XVI by Microstuf. Whether you use an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, the Half Card connects your IBM-XT to the world.

Available at Businessland, Computerland, Genra and other fine dealers nationwide. Also from Ven-Tel: an internal modem for the HP-150 and an external modem with all of the features of the Half Card.

Effortless Communication

From Ven-Tel Inc.

2342 Walsh Ave.
Santa Clara, CA 95051
(408) 727-5721



The Half Card also operates in the PC, Compaq and other IBM compatibles.

Circle 193 on reader service card

The TeleVideo The best hardware



TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.

With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market and

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640 x 200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communications Port	YES	OPTIONAL	YES	YES
MS™-DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	\$2995	\$3843	\$4495	\$5754

PC compatibles. for the best software.

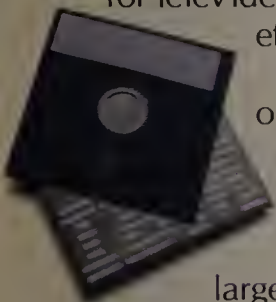
has the standard—not optional—features you need to take full advantage of every job your software can do.

Study the chart below. It proves that TeleVideo—not IBM—offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.



For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept



THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPCII-S	IBM PC
High Capacity Storage	YES	YES
Quiet Operation	YES (NO FAN)	NO
Display	YELLOW	AMBER
Memory	256K	256K
Graphics	YES	YES
Communications Port	YES	OPTIONAL
Printer Port	YES	OPTIONAL
MS™ DOS 2.11	YES	OPTIONAL
Typical System Price	\$2395	\$3130

any IBM hardware options without modification.

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the chart at the left.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than IBM. Better hardware—standard—at a better price.

THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

Call 800-538-8725 for the dealer nearest you. In California, call 800-345-8008.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM—has the best hardware for the best software. At the best price.

IBM is a registered trademark of International Business Machines. MS is a trademark of MicroSoft Corporation. CW Basic is a registered trademark of MicroSoft Corporation.



TeleVideo®
Personal Computers
TeleVideo Systems, Inc.

Circle 701 on reader service card

In the Hard Disk Jungle Tallgrass Clears A Path



In today's hard disk jungle, Tallgrass clears a path by offering high performance, integrated mass storage solutions for the IBM® PC/XT, the T.I. Professional and related computers.

TALLGRASS INNOVATIVE FEATURES

MASS STORAGE SYSTEMS with formatted HardFile™ capacities of 6, 12, 20, 35 and 70 Mb, all with built-in tape backup.

CONVENIENT INTEGRAL TAPE BACKUP SYSTEM allows rapid tape "image" streaming, or incremental file-by-file backup and restore on ANSI standard inexpensive data cartridges, instead of the usual floppies, video cassettes, or low-capacity removable Winchester devices.

NETWORK READY and fully compatible with networks such as PCnet® and EtherShare.™

HIGH RELIABILITY with dual directory and read-after-write verify options. A dedicated landing zone, where the read/write heads reside when the disk is idle, provides data protection during powerdowns and transportation.

Follow the Tallgrass path to your local computer dealer and watch your personal computer transform into a powerful data processing system.

Available from COMPUTERLAND®, Entré® Computer Centers, MicroAge® Computer Stores and other participating computer dealers.

New! IBM-XT Cartridge Tape Backup

World Headquarters: Tallgrass Technologies Corp. 11100 W. 82nd St.
Overland Park, KS 66214 913 492-6002 Telex: 215406 TBYT UR

Canadian Headquarters: Tallgrass Technologies (Canada), 1775 Meyerside Drive
Mississauga, Ontario, Canada L4V 1H2 416 673-3244

European Distributor: CPS Computer Group LTD
Birmingham, England B276BH (021) 7073866

Australian Headquarters: Tallgrass Technologies (Australia) Five Dock Plaza,
Suite 12 50 Great North Road Five Dock Sydney, N.S.W. 2046 (02) 712-2010

Circle 188 on reader service card



**Tallgrass
Technologies**
Corporation

PUT YOURSELF ON OUR PAYROLL.

1283204

HOURS		RATE	EARNINGS		BASIS	OTHER PAY		DESCRIPTION
REGULAR	OVERTIME		REGULAR	OVERTIME		RATE	AMOUNT	
40.00	6.00	10.27	410.80	92.43	46.00 110.00	.85 .25	39.10 27.50	UN VAC TRAVEL

DEDUCTIONS THIS PERIOD		YEAR TO DATE TOTALS	
FHW	106.26	SAIF	.53
FICA	36.34	UNION	10.40
SWH	38.73	UN VAC	39.10
Gross	13495.64	FICA	902.35
FHW	2401.12	SWH	965.22
		SAIF	15.35
		SICK	24.00

10071
PAY PERIOD
12-26 to
12-31-83
No. 10071
TOTAL PAY
569.83
TOTAL DEDUCTIONS
231.36
NET PAY
338.47

EMPLOYEE INFORMATION
Kevin Downington
544-23-5469
50

PLEASE DETACH THIS PORTION AND RETAIN FOR YOUR RECORDS

TIMBERLINE SOFTWARE

Pay: Three hundred thirty-eight dollars and 47 cents
DATE December 31, 1983
CHECK NO. 10071
AMOUNT *****338.47**
treasurer *Kevin Downington*

PAY TO THE ORDER OF
Kevin Downington
425 SE 24th
Hillsboro, OR 97123

⑆010071⑆ ⑆999999999⑆ 999 9999 999⑆

And eliminate your payroll headaches.

Let's face it. Most of us hate doing payroll: figuring taxes, trying to meet those non-stop payday deadlines and worrying about accuracy.

But Medallion® Payroll from Timberline Software eliminates these headaches. It processes all your payroll requirements *on time* and gives you total control over sensitive payroll data.

And Medallion Payroll does it right, thanks to Timberline's 12 years of software experience and feedback from thousands of users nationwide.

Simply...the best

Enter your employee's data on the screen, and Medallion Payroll does the rest. Easily, quickly and accurately. Even unusual situations (such as mid-month draws, tip credits and more) are no problem.

When the processing is done, your employees will get a printed check that is easy to read and understand.

You and your staff will love Timberline's friendly software documentation and support.

You'll agree that Medallion Payroll is simply...the best.

Ask your computer store about Timberline Medallion Payroll, or call (503) 644-8155.

TIMBERLINE SOFTWARE

7180 SW Fir Loop
Portland, OR 97223
(503) 644-8155

See us at
COMDEX/SPRING
booth D540





PLAY WITH CLASSIC STYLE.

Jewel Advanced Business Software™ A Classic Case.

Just about everyone's got accounting software to sell you these days. Trouble is, most of it's rather incomplete. Jewel has the first full-powered, concert quality systems ever to run on micros.

Why? Simple. Our binary tree-based systems allow multiple key setups that provide partial key searches, eliminating the sorts and merges associated with old-fashioned single key ISAM systems currently prevalent. All our programs are fully interactive; input into *one* automatically updates data in appropriate *others*. And programs can be configured to fit particular business situations.

If you're part of a business that needs to stay on top of inventory control, labor costs, billing cycles, receivables, etc., Jewel Advanced Business Software provides more features, power, and value than any other systems available.

Consider the unique Jewel features which: ☐ allow unlimited data capabilities ☐ interface to a spreadsheet for full management reporting ☐ via G/L, produce budgets per account, per period, &

provide last-year comparisons ☐ allow separate income statements per profit center ☐ cannot close out of balance ☐ have complete flexibility in system use ☐ produce reports such as normal & special Income Statements, Statements of Change, & Sources and Dispositions of Funds ☐ via A/P, save money by tracking vendor designated discounts ☐ print aging reports with user-defined periods ☐ project cash flow requirements ☐ profile vendors ☐ via A/R, provide complete Inventory Control ☐ Customer Profiles ☐ generate sales reports by salesman, territory, customer, state, or zip code ☐ track salesmen paid commissions ☐ via O/E, automatically update A/R & allow alternate item selection ☐ create work orders, labels, & lists ☐ produce multiple inventory reports.

Once you discover all the qualities of Jewel Advanced Business Software, you'll see it's a classic in its own time, becoming the leading name in the industry. Look for the Jewel label at local computer product stores. Or call us direct for more information.



HERITAGE HOLDINGS, INC.

611 Anton Blvd., Suite 720, Costa Mesa, CA 92626 714/662-6999 TOLL FREE 800/227-3283

JEWEL is a registered trademark of Heritage Holdings, Inc. JEWEL Advanced Business Software © 1984 by Heritage Holdings, Inc.

Circle 409 on reader service card

Software Independence

To see where the computer software industry is headed in the next six years, we must first look at where the hardware industry is going.

There are now an estimated 150 microcomputer companies battling for a market that doubles annually. Some industry watchers expect that only about ten firms will last through 1985. Those predictions may be overly optimistic.

The much-predicted shakeout can be described very simply: the role of grim reaper belongs to IBM. According to some reports, IBM will account for half the world personal computer market by 1985, with IBM clones taking another quarter. Now comes the new development: IBM will not repeat in the micro market the pattern of dominance it set with mainframes. The evolution of high technology, plus a combination of circumstances, will break the pattern.

The Big Three

Once upon a time there were many auto makers; in a matter of decades, nearly all had fallen. We're now seeing, in a different industry, the rise of another big three. Two are American; they can be summed up in six letters: IBM and AT&T. The third I describe as Japan, Inc., or simply Japan. The other competitors in the

microcomputer industry will have to learn to play the game by the rules of the big three.

The three giants are positioned by circumstance and by nature to conquer the marketplace. The market demands integration, mass marketing and distribution, and the creation of standards. These three marketing giants are primed to oblige.

All three have a similar method of operation: each waits outside a market until the market is clearly established and then moves in and takes over. The implication is that their strong suit is not in developing a new product or market—although they can and have done so—but in marshaling their huge organizations to systematize the marketing of a new idea.

Inevitable IBM

Many people put IBM in the same category as death and taxes: inevitable. But those people sometimes forget why IBM's entry into the micro market was so successful.

Back in 1981, IBM saw micros as the wave of the future, and it knew that it could make its perception a self-fulfilling prophecy by simply entering the market. In this sense IBM traded on its size and reputation. But it also entered with a 16-bit machine. By doing so, it upgraded and redefined the market it was entering. IBM has in part addressed the industry's need for standards by simply becoming the standard.



REMark

AT&T Emerges

IBM and AT&T weren't born as rivals; each grew so big, however, that one bumped into the other.

AT&T—Ma Bell—had become so ungainly that the Justice Department decided to whittle it down to merely gargantuan size.

As the country automates, telecommunications is becoming an essential medium for conducting business and other activities, an essential part of the office of the information age. AT&T, which still owns the massive Western Electric and Bell Labs subsidiaries, is the world's largest telecommunications company.

Now that it cannot serve local phone customers, it's looking around for something else to do. Thanks to deregulation, it can do almost anything it wants, and it's in a superb position—because of its outstanding research, manufacturing, and marketing capabilities—to advance in the field of computers, as it began doing last March.

Japan, Inc.

The third major player in this Brave New World is not one company but a group of companies that spans a number of industries. It is, in some ways, an oversimplification to speak of Japan, Inc., as if there actually were such a monolith. But by virtue of their similar methods and their national insularity, the Japanese high-tech companies act as a single force on the world market.

Japanese computer industry sales are rising at a rate of 15.2 percent a year—faster than Japan's GNP. The Japanese have been consistent. In the best tradition of IBM or AT&T, they target a market, prepare to assault it, and then wait as long as necessary, even at considerable sacrifice, for their best opportunity.

Each of the big three stands poised to smother any rival that appears threatening. How they will fare in

head-to-head competition remains to be seen. Unfortunately, one of their first big battlegrounds will be the turf currently inhabited by the software industry.

Maintaining Independence

The further we move into the information age—that is, as computers become more available to the general public—the more software rises in relative importance to hardware. For that reason I believe the big three will next target the software industry for conquest. They have the ability, the motivation, and the inclination to do so.

The big three will enter the software market in part to fill a vacuum—one created by the changing needs of the consumer. Today's personal computer users, whether at home or at work, want a higher level of standardization and user-friendliness than small, isolated software companies may be able to provide.

The fact that software drives hardware is last year's news. The fact that the big three will try to use proprietary software to accelerate hardware sales and to compete with each other is the real issue that we face for the remainder of the decade.

AT&T, IBM, and Japan, Inc., have monetary resources and marketing power. They will make some of the best software available for their hardware, sell it at an affordable price, but keep their systems as open as possible to provide consumers with the software they want and to keep software manufacturers from flocking to other companies.

Software Strategies

So what strategies should software companies follow in the 1980s as they face a hardware environment dominated by giants that have the ability and competitive impetus to enter the software market? Software companies can emphasize three areas: product strategy, technology, and marketing.

The first testing ground for independent software companies is to adapt to the new user. That means

going beyond user-friendliness as we know it to the point at which we have software that works as easily as a TV or a stereo. For independents, the bad news is that achieving such a level of user-friendliness will not be easy. The good news is that if anybody can do it efficiently and well, independent suppliers can. The key is creativity.

I don't deny that AT&T, IBM, and the Japanese are capable of creativity. But history has shown that smaller, independent organizations are more creative and have greater success than larger, bureaucratic organizations in turning out unique products.

I offer one main technological theme: successful independents will be those who achieve a high degree of portability. *Portability* means that a program can be run on a wide variety of machines. It doesn't make sense for IBM or the other giants to develop highly portable software, because they want their software to give them a marketing edge with their hardware.

Finally, the successful independent has to be willing and able to adapt quickly to the software developments promulgated by the big three. What will distinguish the successful software company from the mere survivor will be that company's ability to adapt in four broad marketing avenues: domestic retail, OEM sales, national accounts, and international accounts.

Following these strategies will require versatility, adaptability, and what is perhaps our greatest resource, creativity. The bottom line for independent software manufacturers in the face of the big three is expressed by a line from the Broadway musical *Annie Get Your Gun*: "Anything you can do I can do better." ●

Robert H. Glidden is former co-chairman of Perfect Software, Inc., in Berkeley, California.

The new HERCULES Color Card gives you the parallel port IBM® forgot—for \$1 more.



And it fits into the XT's short slot.

The new Hercules Color Card gives you these five important features.

1. A parallel printer port. If you buy IBM's color card, you won't get a parallel port for a printer. Ugh. You've just wasted a valuable slot for an extra printer card.

2. It's short. Our new Color Card uses advanced gate array technology to reduce the chip count by 30 and use less than half the board space IBM does. Which makes the new Hercules Color Card perfect for the short slot in an XT.

3. Fully IBM compatible. Any program that runs on IBM's color card will run on the new Hercules Color Card. With RGB or composite video, any IBM compatible monitor will work too.

4. Hercules Graphics Card compatible. If you have a Hercules Graphics Card (model GB101 or later), or plan to buy one, an ingenious software switch on our new Color Card allows both cards to be kept in the system at the same time.

5. Low price. At a suggested list price of \$245, the new Hercules Color Card has all these features for only \$1 more than IBM's color card.

Call for our free information kit. See why the company that made the first graphics card for the IBM PC still makes the best.

**Hercules. We're
strong on graphics.
800 255 5550 Ext. 421**



Address: Hercules, 2550 Ninth St, Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063 Features: 2 year warranty Foreign distributors: CompuServe/Canada; Reflex/U.K.; Computer 2000/W. Germany; Edisoft/France; SourceWare/Australia. Trademarks/Owners: Hercules/Hercules Computer Technology; IBM/International Business Machines.
Suggested List Price as of 2.22.84 for the IBM Color Graphics Adapter.

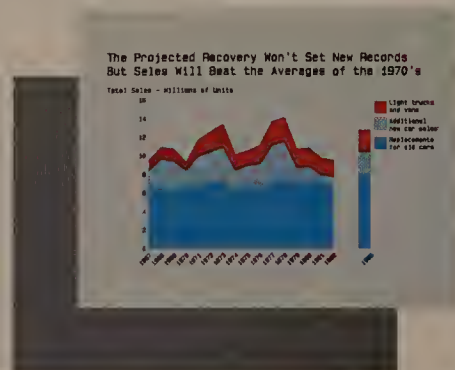
It's easy to see why DEC, Hewlett Packard, NEC and Burroughs chose

Graphwriter[®]
for presentation
graphics.
**Now available
on PC-DOS.**

When Digital Equipment Corporation, Hewlett Packard, NEC Information Systems, and Burroughs Corporation selected a presentation graphics package to offer with their microcomputers, they surveyed the market carefully. All of them made the same decision: They chose **Graphwriter**.

When you choose a presentation graphics package for your personal computer, you will look for the same capabilities these major manufacturers looked for. Highest quality output. More chart types. Flexibility to create just the look you want. And easy enough for everyone in your organization to use. Only **Graphwriter** can give you the power of a main-frame graphics package on your microcomputer.

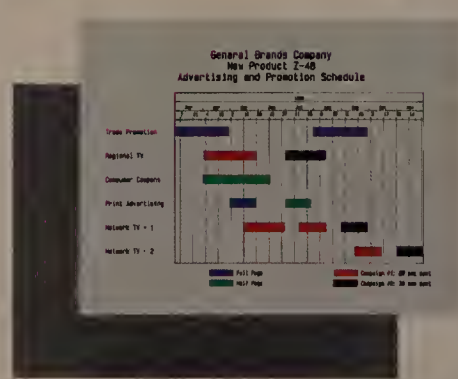
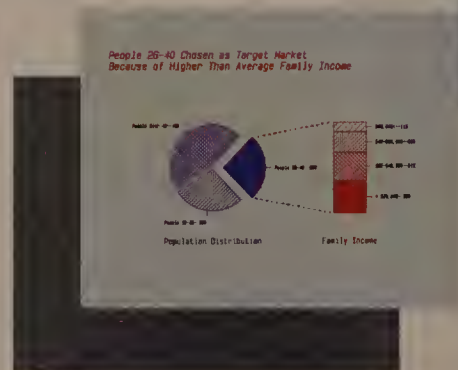
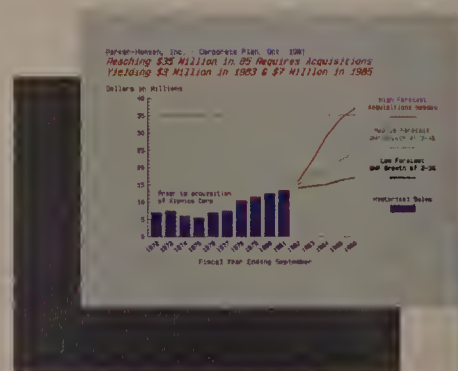
It's easy to see why **Graphwriter** is the standard for presentation graphics—for hardware manufacturers as well as personal computer users like you.



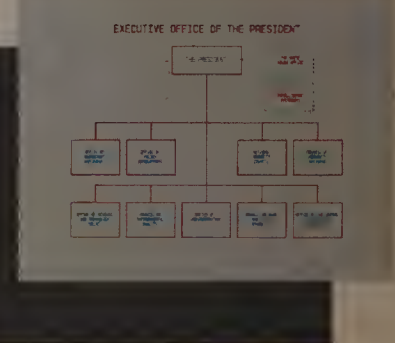
Graphwriter is available for:

IBM PC and XT
DEC Rainbow
HP 150
NEC APC
Burroughs ET2000

Graphwriter is available through ComputerLand and Entre Computer Centers. Call: 1 800 HI-ENTRE



More graphic formats
column (vertical) charts
stacked column
clustered column
bar (horizontal) charts
stacked bar
clustered bar
single pie
double pie
triple pie
quadruple pie
proportional pie
line charts
scatter plots
bar-line combination
text/word charts
Gantt
organization
bubble
table
pie-bar combination
surface line
stacked line
line-table
double stacked bars
range
paired bars
overlay text
More flexibility
move chart elements
heading justification
footnote justification
italic fonts
bold fonts
bold lines
variable font size, all text
variable font color, all text
values displayed on bars
values displayed for pie slices
adjustable bar widths
adjustable pie sizes
pie rotation
pie placement
single bar color control
single bar omission
unequal line lengths
8 line types
4 line marker types
8 line types
5 frame options



8 fill patterns
axes labels (\$, % or x)
log scaling
semilog scaling
multiple curve fits
floating comments
More space for your message
150 character heading
150 character footnote
150 character comment
50 character axis titles
40 character legends
20 character bar/slice labels
More ways to present
paper
transparencies
35mm slides
coated paper plotting
horizontal page plotting
vertical page plotting
multiple plots per page
custom size and location
graphics only plotting
Easier to use
individual format programs
pre-designed formats
format selection from chart book
input forms
spreadsheet file access
data transfer between formats
format-specific help messages
prompt-specific help messages
user-defined default options
screen preview
preview plotting
printed proof sheet
"built-in artist"
automatic chart composition
automatic page layout
pen sorting
minimal pen changes
pen change prompting
faster solid fill
transparency color separation
automatic storage of last data
chart storage
template storage

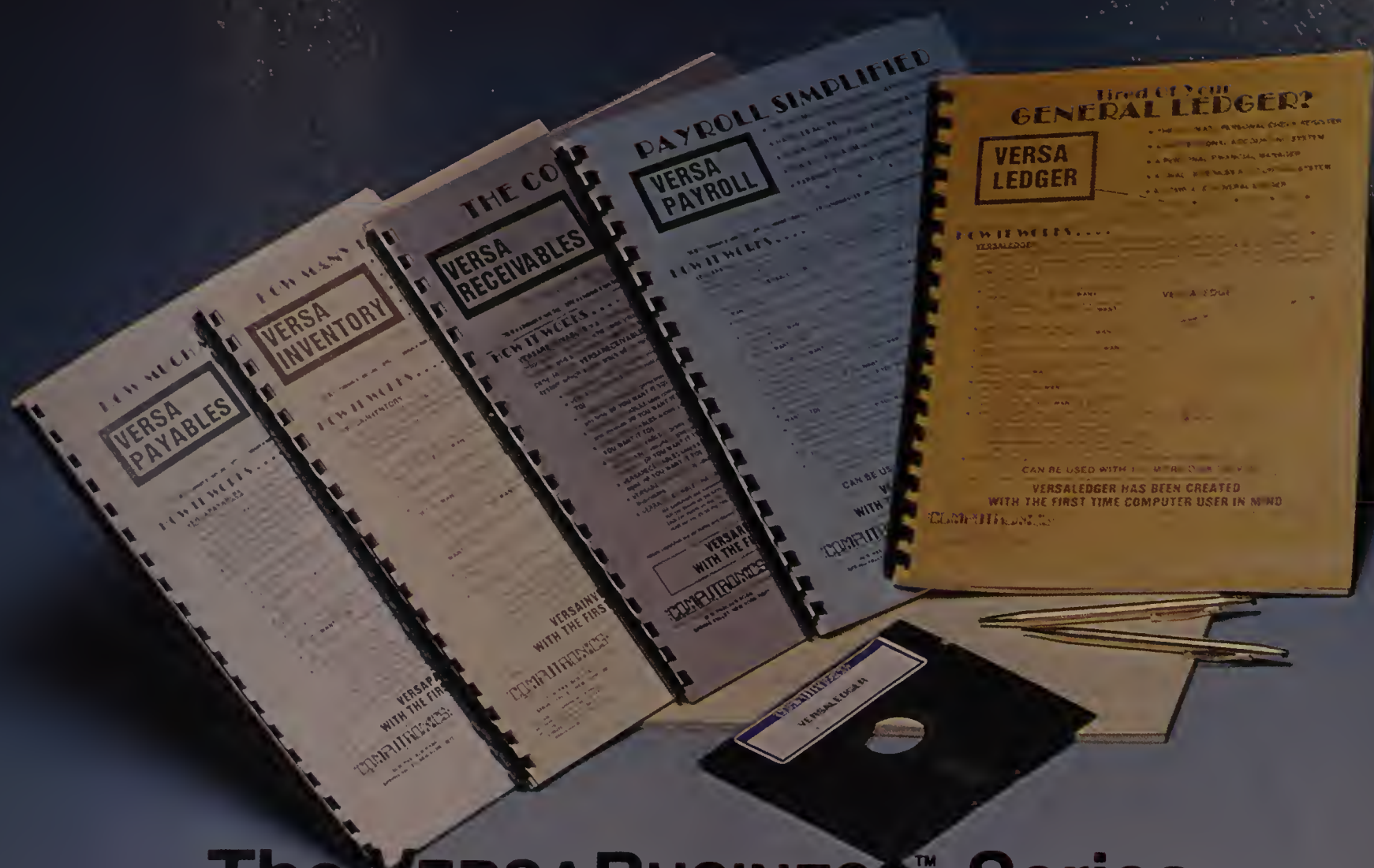
For more information, contact:
Graphic Communications, Inc.
200 Fifth Avenue
Waltham, Massachusetts 02254

617 890-8778

Circle 502 on reader service card

Introducing the Most Powerful Business Software Ever!

FOR YOUR TRS-80 • IBM • APPLE • KAYPRO • COMMODORE 64 • MSDOS OR CP/M COMPUTER*



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ \$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ \$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ \$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ \$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ \$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80).

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.



COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

*The VersaBusiness Series is available for TRS-80 · IBM · APPLE · KAYPRO · COMMODORE 64 · OSBORNE · XEROX · TELEVIDEO · SANYO · ZENITH · NEC · DEC · TI · EPSON · MORROW · MICRO DECISION · NORTHSTAR · MSDOS and CP/M computers with 8" disk drives (Computer names are tradenames and/or trademarks of their respective manufacturers).

WANTED



SOMETHING TO RELIEVE THIS MESS!

If you've ever found yourself searching for a calculator, notepad or appointment book when you've got a computer right in front of you, then you know the absurd situation we're illustrating.

Sure, there are clumsy little programs you can boot up to accomplish one or the other of these tasks . . . but that's generally meant first stepping out of the software you're working with.

What's always been needed is one powerful piece of software, occupying only a few K, that would be tucked away in an unused part of RAM no matter what program you're running.

Whether you were running dBaseII, Lotus 1-2-3, WordStar or even Turbo Pascal® . . . it would always

be ready for lightning-fast use. You could just hit a button and open a window for a notepad, another for a calculator. Hit the button, again, and your work would be saved to disk and you'd be right back in your original software!

While we're at it, it should also have a perpetual calendar linked to a datebook. And even an autodialer, with a built-in phonebook.

Is this piece of software possible? At a price you can afford . . . now?

DELIVERED

Something totally new in applications software from Borland, the folks who make Turbo Pascal®

JUST A KEYSTROKE AWAY. . .

NO MATTER WHAT SOFTWARE YOU'RE RUNNING!

- A CALCULATOR
- A NOTEPAD
- AN APPOINTMENT CALENDAR
- AN AUTO DIALER
- AN ASCII TABLE
- AND MUCH MORE

ALL AT ONCE . . . OR ONE AT A TIME.

ANYWHERE ON THE SCREEN YOU LIKE.

ANOTHER KEYSTROKE, AND YOU'RE RIGHT WHERE YOU LEFT OFF IN YOUR ORIGINAL PROGRAM!
(you never really left!)



SIDEKICK®

INTRODUCTORY OFFER

\$49.95

Available only for the IBM PC, XT, jr. and Compatibles.

SIDEKICK

NOW . . . Whether you're working in dBaseII, Lotus 1-2-3, WordStar or whatever . . . You'll have your SIDEKICK®, too!

Something brand new. Crafted in Assembly language as carefully as Borland's famous Turbo Pascal®, so that it's lightning-fast and as compact as only Borland knows how to make it! With a notepad that has a full-screen editor that saves your notes to disk. You can even swap information back and forth between your applications software and your Sidekick.

Suppose you're working with a spreadsheet, and you suddenly have an important idea. Just hit the button, a window opens, you write the note and hit the button again. You're right back where you left off in the spreadsheet.

Need to make a phone call? Whether the number is in an existing database, your own Sidekick phone directory, or you've just typed it on the screen . . . put the cursor next to the number, hit the keystroke, and Sidekick dials for you!*

There's lots more, too. You can move the Sidekick windows anywhere on the screen you like. And you can have as many on screen at a time as you need.

We designed it because we needed it. If you've ever been writing a report and needed to do a quick calculation, or jot down a note, then you understand why.

*Only with Hayes Smartmodem and compatibles.

YOU CAN ORDER YOUR COPY OF SIDEKICK® TODAY!

For Visa and MasterCard orders call Toll Free **1-800-227-2400 ext 953** in California **1-800-772-2666 ext 953**
(lines open 24 hours, 7 days a week) Dealer and Distributor Inquiries Welcome 408-438-8400

SIDEKICK® \$49.95

(plus \$5.00 shipping and handling
• Shipped UPS)

Check ☐ Money Order ☐

VISA ☐ MasterCard ☐

Card # _____

Expiration Date _____

Please be sure your computer is an IBM PC, XT, jr., or *true* compatible!

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

TELEPHONE _____

California residents add 6% sales tax. Outside U.S.A. add \$15.00. (If outside of U.S.A. payment must be by bank draft payable in the U.S. and in U.S. dollars.) Sorry, no C.O.D. or Purchase Orders.

BORLAND INTERNATIONAL

Borland International
4113 Scotts Valley Drive
Scotts Valley, California 95066
TELEX: 172373



WITH IBM PC AT THE OFFICE
AND PC_{jr} AT YOUR HOUSE,
YOU CAN TAKE WORK HOME
ON YOUR LITTLE FINGER.

Many business people already know about the IBM® Personal Computer family.

Many are now hearing about its new member, the IBM PCjr.

And some have already discovered how PC and PCjr can work together.

THE JOY OF PERSONAL COMMUTING

PCjr bears a strong resemblance to the rest of the family.

If you know how to operate PC or PC/XT, you can operate PCjr easily. If you have programs for PC or PC/XT, you'll find many of them will run on PCjr.

Now, much of what you start at the office, you can finish at home, and vice versa.

And while you're at the office, your family will find plenty to do with PCjr.

THE BRIGHT LITTLE FAMILY ADDITION THAT CAN GROW UP FAST

PCjr is a powerful tool for modern times. With easy-to-follow new IBM Personal Computer programs, and with options like a printer and an internal modem for telecommunications, it can handle a great variety of jobs.

Children can learn new ways of learning, and make short work of homework. Adults can keep track of household expenses, write letters, file tax data, plug into information networks. And everyone can enjoy challenging new cartridge games.

IBM designed PCjr with lots of bright ideas to make computing easier.

The "Freeboard"—a keyboard that doesn't need a connecting cord—is easy to get comfortable with.

Built-in picture instructions can help the first-time user get started.

Diskette-drive systems include a program that allows users to explore computer fundamentals at their own pace. And to get

PCjr up and running from the very first day, a Sampler Diskette with eleven useful mini-programs is also included.

HOME ECONOMICS: IBM DISKETTE COMPUTING FOR ABOUT \$1300

PCjr is the most affordable of the IBM personal computers.

A diskette-drive model with a 128KB user memory is about \$1300. An expandable 64KB cassette/cartridge model is about \$700. (Prices apply at IBM Product Centers. Prices may vary at other stores.)

For a demonstration, visit an authorized IBM PCjr dealer or an IBM Product Center. And you can find the store nearest you with your little finger. Just dial 1-800-IBM-PCJR. In Alaska and Hawaii, 1-800-447-0890.



Little Tramp character licensed by Bubbles Inc., s.a.

MICROSOFT
P R E S S

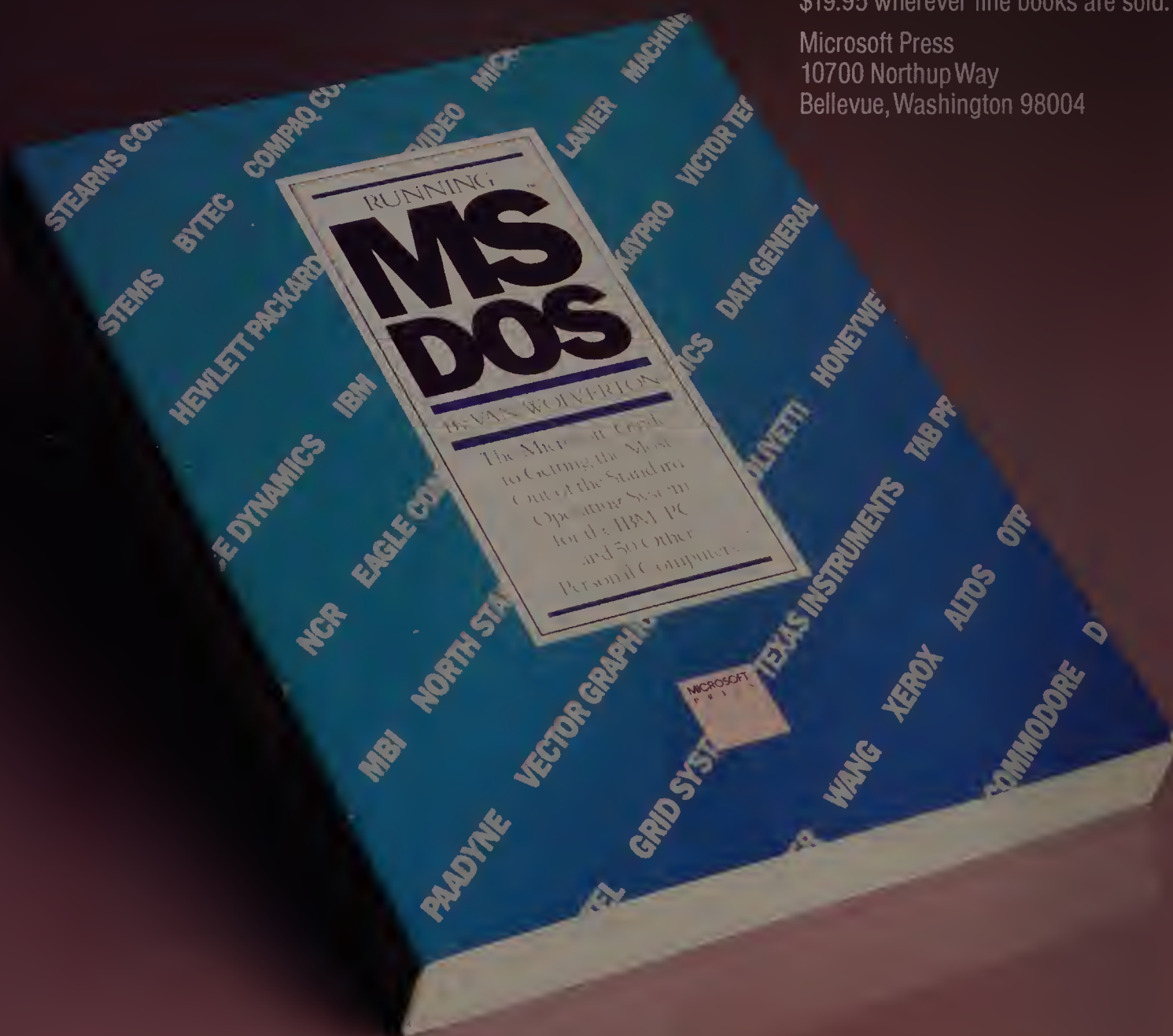
**Microsoft-DOS is now
used on over 3 million
16-bit personal
computers. Chances
are one of these
computers is yours.**

If so, you need **RUNNING MS-DOS**, the ultimate sourcebook for mastering the full power of the software that tells your computer how to think. Here, for the first time, is inside information that will enable you to streamline your computer, set up a multi-level filing system, employ the text editor, build and sort a miniature database, create customized commands, and manage your monitor, printer, disk drives and modem.

Microsoft developed MS-DOS for the Intel 8088-based IBM PC. Author Van Wolverton brings years of experience writing for IBM and Intel. **RUNNING MS-DOS**. Another classic from Microsoft Press.

\$19.95 wherever fine books are sold.

Microsoft Press
10700 Northup Way
Bellevue, Washington 98004



Letters

Major Differences

Major B. L. Olmstead's *REMark*, "The Knowledge Workers," [PCW, Vol. 2, No. 5] contains a number of flaws characteristic of trend-spotting discussions of the social impacts of technology.

What is the "sheer momentum of technology" he speaks of, and why will it "force a revolution in the office and society of the 1990s"? How will the "automated economy ... integrate itself into society"? The microcomputer phenomenon is about five years old, possibly less. Ascribing to it the status of a force of nature (never mind endowing it with human qualities) is at least premature.

Assertions about the productivity capabilities of computers are a more serious problem. Sure, microcomputers allow you to do a lot more things in a lot less time, so for individuals they're more productive. But how about for corporations? It's at least arguable that the major impact of office automation is the replacement of cheap labor by expensive labor.

Also, there's no evidence supporting the telecommunications/transportation trade-off Olmstead speaks of. My own research suggests that only about 2 million workers in a labor force of 120 million will be "telecommuters" by 1990: it's too expensive even in the best of forecasted circumstances. Finally, Olmstead's labor force analysis is just wrong. Greater numbers of economists are arguing that blue collar workers will constitute about 50 percent of the labor force indefinitely.

Kenneth R. Donow
Elmwood Park, New Jersey

The Xeno Copies

I have just read the review "The Compatibles Line Up" by Robert Luhn [PCW, Vol. 2, No. 4] and found it very illuminating. However, in the course of the article Mr. Luhn refers to *Xenocopy* as the acid test of compatibility and states, "Predictably, none of the compatibles, including the Compaq, could run *Xenocopy*." The documentation [for *Xenocopy*] put out by Vertex Systems mentions that *Xenocopy* will run on the Columbia, Corona, Hyperion, Sperry, TeleVideo, Chameleon, Compaq, and Tava compatibles (among others). Mr. Luhn states that each of the above machines could not run *Xenocopy*. Could you please explain this discrepancy?

James R. Weiner
Brussels, Belgium

The version of Xenocopy used in testing compatibles was an early-release, PC-specific package. Vertex has since released a version of Xenocopy that will work on the compatibles you mention. (See Compatibles Update, PCW, Vol. 2, No. 7, for more details.)—Ed.

Hyperion à la MODE

Your low estimate of IBM compatibility for the Hyperion ["The Compatibles Line Up," PCW, Vol. 2, No. 4] seems to indicate that your reviewer did not fully understand the use of the [Hyperion's] unique MODE command to modify the screen display. This command allows the Hyperion to handle software designed for either a monochrome or a color graphics adapter, to use IBM or ASCII character attributes, and to otherwise customize processing oper-

ations. Since the Hyperion normally defaults to a color graphics mode (unless changed on the system disk by MODE), *WordStar* probably didn't work because it requires the monochrome display mode. I have personally used *WordStar* 3.3 with the high-resolution Hyperion screen, and it was easy to read and quite fast in execution.

Craig D. Venator
Decatur, Georgia

Combination Key Conundrum Continued

In the May 1984 issue of *PC World* [Letters, PCW, Vol. 2, No. 5], Robert A. Hurlbert's letter discusses the use of a Radio Shack device to hold down the <Alt>, <Shift>, or <Ctrl> key. While the \$7.95 price is attractive relative to that of Rose-Soft's *ProKey*, there is an alternative that is even cheaper and much better.

The public domain program *Keyloc* not only gives the combination keys a toggle action but also provides beep tones that indicate the new state whenever one of those keys is operated.

Because of some changes in ROM code there are two versions of *Keyloc*. Both versions, in both .EXE and .ASM form, are on the current Silicon Valley Computer Society disk no. 43, along with a bunch of other neat stuff. Order from the Silicon Valley Computer Society, P.O. Box 60506, Sunnyvale, CA 94022—\$6.50 total.

Herb Shear
Los Altos, California

Letters

Jr Canine

This is in answer to your request for "initial reactions" to the PCjr.

I've been involved with computers for about 15 years. I can remember when the only trustworthy storage device was a punched card. Data written to tape was often not readable, especially if the tape was mounted on a drive different from the one on which it was written. The "mainframe" I used had a memory of 28K and was down 80 percent of the time. It was not an IBM machine. When I was introduced to an IBM 360 XXX, I could hardly believe what I found: it was up most of the time, and tapes could be read years later—even on different machines. I became convinced that IBM was truly a remarkable company; even more, it was a national asset, and I'm dead serious about that opinion. I like IBM products, and I think the company takes a lot more abuse in the media than it deserves.

However, companies do make mistakes, and I believe the PCjr is a mistake. I've seen it and read about it. Doug Clapp (*InfoWorld*, Vol. 6, Issues 2 and 3) described it well. An excerpt from his opinion: "It was too expensive. It couldn't be sold on the basis of features—it didn't have any . . . to say the jr even has a keyboard is far too charitable."

It bothered me to read the glowingly positive articles in *PC World* [Vol. 2, No. 2] about the PCjr. It certainly makes me suspicious about the objectivity of the editors of *PC World*.

The label on the PCjr should not be IBM; it should be D-O-G.

Gene Doremus
Houston, Texas

Disappointed by Gemini

I was delighted to see the letters in the February issue of *PC World* concerning the Gemini 10 printer [*Letters*, *PCW*, Vol. 2, No. 2]. I immediately wrote Mr. Fritsch of Star Micronics to obtain more information in response to his statement that "The other solutions to this slowdown involve a little more than plugging a box into the system. . . . I invite those readers who want more specific information to write or call us at Star Micronics National Service Headquarters." I indicated that I desired the information to which he made reference.

I received a prompt reply that in essence reiterated the information concerning the installation of a buffer. (If I had wanted to spend more money, I might have purchased a different printer.) I wrote again referring specifically to the sentences cited above and again requesting the information referred to. After nearly a month I received a telephone call from Star Micronics asking what information I really wanted. I again cited the statement contained in Mr. Fritsch's letter. Again I was told I could purchase a buffer. When I

pressed for more information, I was told they have no patches that will solve the situation, they will not upgrade my printer to one which will work without the slowdown, and there is sufficient information in the printer manual to enable me to write a patch to BIOS myself.

I feel that the support I have been offered is not consistent with the tone of the letter written by Mr. Fritsch. I sincerely hope Star Micronics will provide better service in the future and I wish them well, but in the meantime it appears I will have to put up with a product that is poorer than I believe they advertised.

Robert L. Wilson, Sr.
Lexington, Virginia

Super Support

In Katie Seger's article, "What Happens If It Breaks," [*PCW*, Vol. 2, No. 3] she labels the PCjr 12-month warranty program "a laudable precedent" when in fact it is not.

Digital Equipment Corporation (DEC) announced their 12-month, on-site warranty program for the Professional 300 series, the DECMate II, and the Rainbow 100 in October 1983. In addition, DEC offers toll-free telephone support during the warranty period.

Theresa D. George
Lynne Teckman
Susanna Hyatt-Simpson
Marietta, Georgia

Here's a tax preparation software system we're practically giving away.

**It's our annual post-tax
season sale! A Micro-Tax
1983 professional tax
preparation system...
regularly \$1,000 during
the current tax year...
is yours for only \$58.**

Prove to yourself how your in-house microcomputer can eliminate the drudgery of manual tax preparation and generate more profits for your business. A \$58 investment in a 1983 Micro-Tax software system will convince you.**

Micro-Tax is compatible with your IBM PC*, IBM XT*, DEC Rainbow*, and most other personal computers with CP/M*, PC DOS*, or MS DOS*. For specific hardware and software requirements, contact us at 1 (800) MICROTAX or 1 (214) 934-7000.

Look what this system can do:

- Computes and prints over 30 Federal Individual schedules and forms for multiple clients.



\$58.00

There are more time- and cost-saving features to Micro-Tax. "Hands-on" experience with our 1983 system will convince you. You'll see how next year will be your most profitable tax season ever.

You have the options of our full Federal, Individual, Partnership, Corporate, or integrated State package, each for the same low price.

Refer to chart for systems available, then send in the coupon with your check, Visa, or MasterCard today for immediate delivery.

1983 SCHEDULES AND FORMS INCLUDED

[illegible]

- Integrated State Tax returns available • Orders taken for yearly update packages
- All forms and schedules subject to IRS changes for 1984 tax year

MICROCOMPUTER TAX SYSTEMS, INC.

A wholly owned subsidiary of Computer Language Research, Inc.

- *CP/M: a trademark of Digital Research Inc., DEC Rainbow: a trademark of Digital Equipment Corp.; MS DOS, a trademark of Microsoft Corp., PC DOS, IBM PC, and IBM XT: trademarks of IBM
- **Does not include updates or revisions

* * Does not include updates or revisions

Mail to: **Micro-Tax CLR**, P.O. Box 111012, Carrollton, TX 75011-1012
Phone: 1 (800) MICROTAX or 1 (214) 934-7000

Please send me the 1983 Micro-Tax micracomputer tax preparation packages (Reg. \$1,000 each) checked below for \$58 each. California residents add 6½% sales tax. Texas residents add 6% sales tax.

- | | |
|--|------|
| ☐ Professional Individual Package | \$58 |
| ☐ Partnership Package | \$58 |
| ☐ Corporate Package | \$58 |
| ☐ State Package (Where available) | \$58 |

Name of State _____ Total _____

☐ CP/M ☐ PC DOS ☐ MS DOS

Make of your computer: _____ Disk size: _____

Name: _____
(Please Print)

Street: _____

City/State/Zip: _____

Phone: () _____

Check for: \$_____ made out to **Micro-Tax**, enclosed.

☐ VISA ☐ MASTERCARD Expiration date: ____/____/____

[illegible]

Signature: _____

ORDER BY MAIL OR CHECK WITH YOUR LOCAL SOFTWARE DEALER.

Letters

Jr's Tutor

In "Charting the PCjr Software Course" [PCW, Vol. 2, No. 2], a common misconception was perpetuated. To correct it, let me assure your readers that *Private Tutor* does run on the PCjr.

Private Tutor is packaged with DOS 1.10 on the disk, and the differences in the disk drives on the PCjr are such that I/O errors can occur. Such errors are infrequent but may occur due to the PCjr's different I/O timing. The solution is to copy DOS 2.10 onto the *Private Tutor* disks. Operation is then normal.

I have been assured that the list of PCjr-compatible programs published by IBM has been altered to correct this error.

Thomas K. Brown
San Jose, California

Get Our ACT Together

The article reviewing the ACT Apricot ["The Compatibles Line Up," PCW, Vol. 2, No. 4] contains incorrect information.

The telephone number listed in the review is our fax machine number. The correct number is 408/727-8090. Also incorrect is the company name, "ACT Ltd." ACT Ltd. is located in the United Kingdom. ACT (North America) Inc. is a subsidiary of ACT.

Victoria Wyatt
ACT (North America) Inc.
Santa Clara, California

Back to the Bench

Your interesting article comparing three different FORTRAN compilers ["But Is It Really FORTRAN?" PCW, Vol. 2, No. 2] demonstrates the danger of careless benchmarks. The results suggest that the Microsoft version is about nine times faster than the IBM version. This is surprising since both compilers were written by Microsoft.

Unfortunately, the comparison was not made on an equal basis. The debug mode defaults to off for the Microsoft version and to on for the IBM version. The authors should have added the compiler directive \$NODEBUG to the first line of each IBM program. This dramatically speeds up execution. The resulting code is also much smaller.

Alan R. Miller
Socorro, New Mexico

Thank you for calling this error to our attention. Had the \$NODEBUG metacommand been included in the IBM code, the results of the execution speed tests for the IBM compiler would have been similar to those for the Microsoft compiler. However, this fact does not change the overall con-

clusions of the article. The IBM compiler still has no advantages over the Microsoft compiler. Microsoft FORTRAN has many language features that IBM FORTRAN does not have. It also provides a very well implemented 8087 library that greatly improves its floating point operation speed with the 8087 numeric coprocessor.—Charlie Huizenga and Chip Barnaby

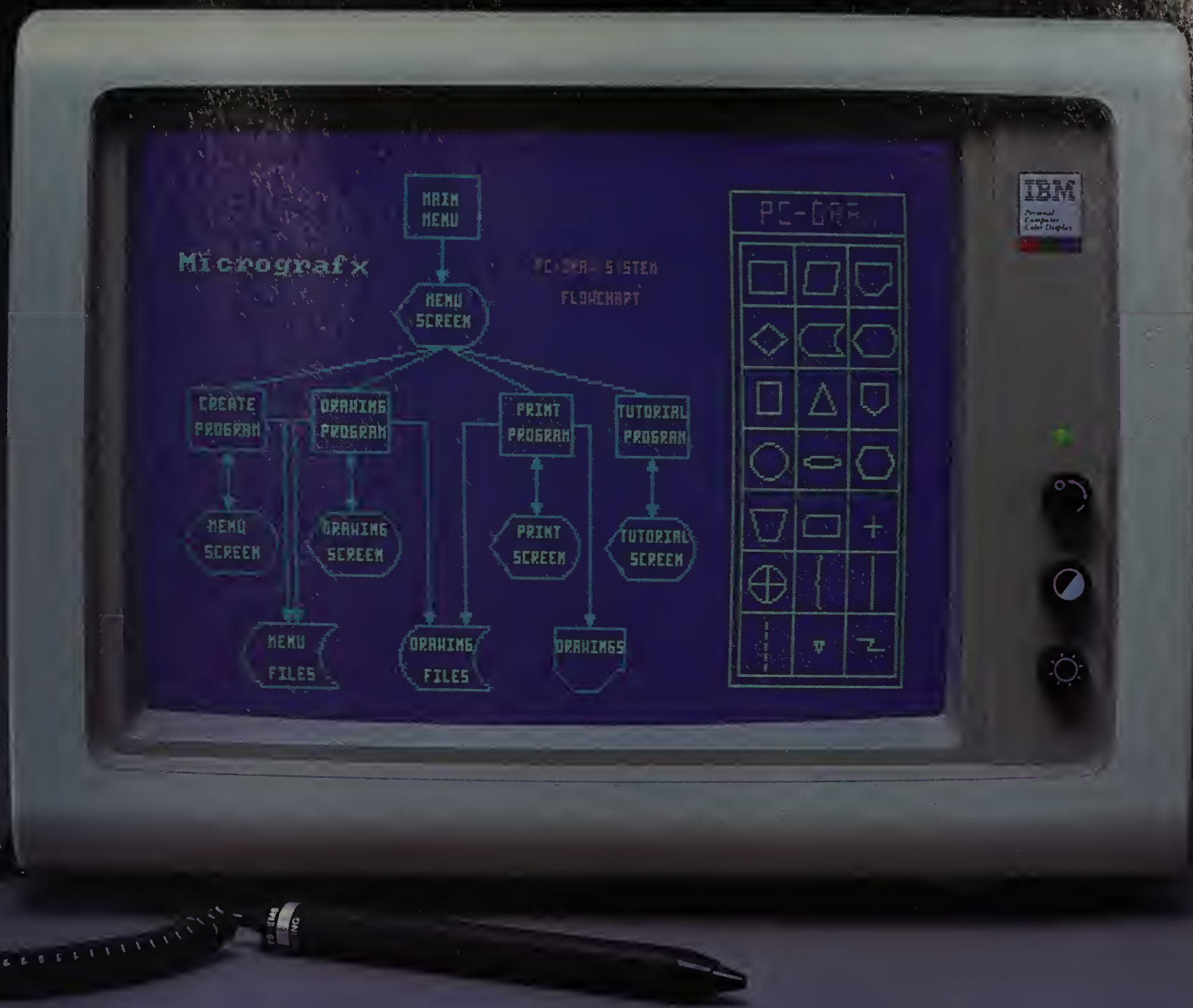
End of the Line

I thought I knew what an ASCII text file was, but your editor's note ["Getting the Word," PCW, Vol. 2, No. 4] threw me. Every text editor I have ever used ends each line with an invisible end-of-line marker. The marker usually consists of a carriage return (ASCII 10) and a linefeed (ASCII 13). Yet you state that you accept articles for publication that use ASCII characters 32 through 127 only. How can this be?

Bill Kraengel, Jr.
Valley Stream, New York

It can't; you're right.—Ed.

Letters should be mailed to Letters, PC World, 555 De Haro St., San Francisco, CA 94107, or sent electronically to CompuServe 74055,415 or Source STE908. We reserve the right to edit letters for reasons of space and clarity. Letters should not exceed 300 words in length. ●



PC-Draw from Micrografx, the drawing system for your office or home.

Now, you can create diagrams, illustrations, charts and drawings on the IBM PC or XT™

And reproduce them all with your printer or plotter.

With this versatile, easy-to-use graphics program, you can produce diagrams, schematics, charts and drawings in virtually limitless varieties.

PC-Draw provides you with three symbol libraries (software design, electrical design, and alternate text), multiple text fonts and the capability to design your own symbols, with an extensive set of graphic functions provided for symbol manipulation. These functions include object scaling, rotation and placement. PC-Draw lets you unleash your creative energies in data processing design, floor plans and interior design, graphic



illustrations, electrical design, and other drawing/drafting applications. And PC-Draw supports an optional light pen.

The PC-Draw system requires an IBM PC or XT™ with graphics monitor, graphics adapter, 128K of RAM and two diskette drives or one diskette drive and a hard disk.

PC-Draw: \$395 (Includes HP7470A/7475A Plotter Support). Light Pen: \$195. Plotters

and Graphics boards at competitive prices. To order or for information call (214) 234-1769 or write Micrografx.

MICROGRAFX INC.

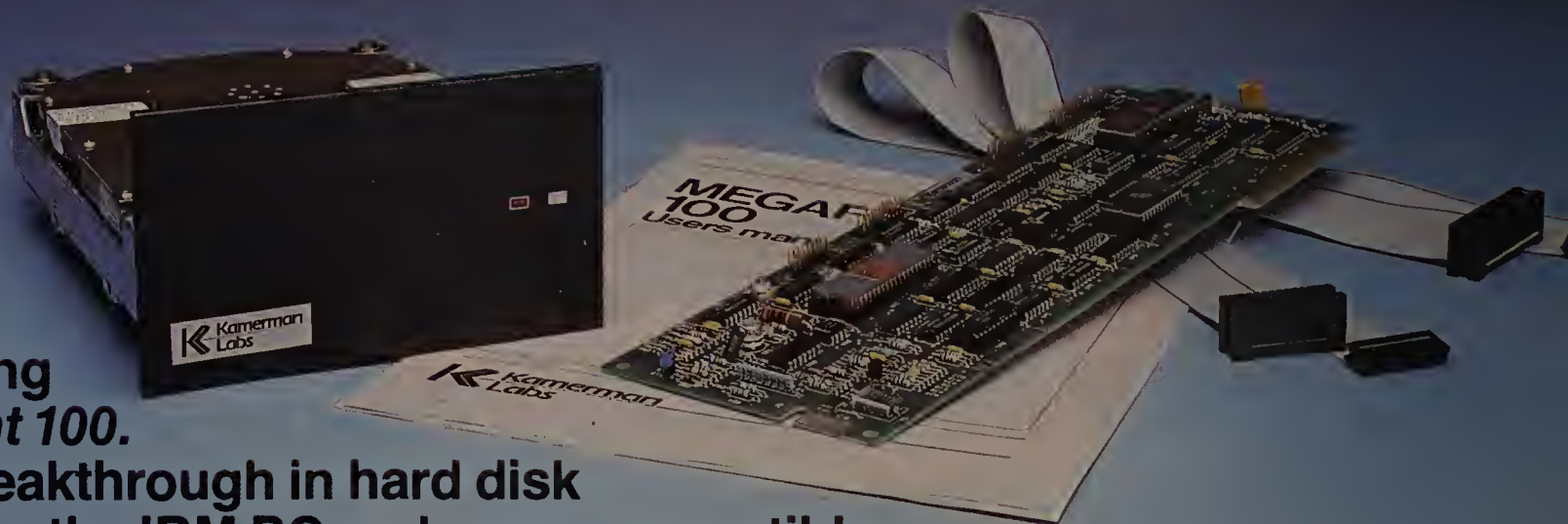
1701 N. Greenville Ave., Suite 703/Richardson, TX 75081
(214) 234-1769

© 1983 Micrografx

FOR THE IBM PC*, COMPAQ*, ETC.



10 Mbyte Hard Disk System \$895



Introducing Megaflight 100.

A cost breakthrough in hard disk storage for the IBM PC and many compatibles.

At last! A real cost revolution in hard disk storage. The Megaflight 100 is a high-performance, half-height hard disk system which includes a state-of-the-art drive unit, disk controller card and software. You get 10 Megabytes (formatted) of high-speed data storage for less than half the cost of comparable PC hard disk systems!

Full hardware and software compatibility.

Megaflight 100 features full plug compatibility with the IBM XT, requires no extra power and uses IBM's DOS 2.0 or 2.1 software driv-

ers. You're assured of complete compatibility with all future XT releases, and network systems such as PC Net,** Etherseries** and Omninet.**

Installation in less than 20 minutes.

Megaflight 100 includes everything you'll need for internal installation in the PC, Compaq, and others. This includes cables, easy installation instructions and a comprehensive manual. Installation typically takes less than 20 minutes and requires no special technical knowledge.

One year warranty.

Megaflight 100 is covered by a one year warranty on parts and labor.

To order, send check or money order for \$895 (includes shipping and handling) to the address listed below. Or use Visa or MasterCard and call our toll free number to order today (add 3% service charge for Visa and MasterCard).

Call toll free **800-522-2237**.
In Oregon, Alaska and Hawaii call 503-626-6877.

Dealer, OEM inquiries invited.
For more information call
503-626-6877.

*IBM is a registered trademark of International Business Machines. COMPAQ is a trademark of COMPAQ Computer Corporation.

**PC Net is a trademark of Orchid Technologies. Omninet is a trademark of Corvus Systems. Etherseries is a trademark of 3Com.



7787 S.W. Cirrus Dr., Bldg. 26, Beaverton, OR 97005
Phone 503-626-6877

Circle 683 on reader service card



Fortunately simple visual database software.

Seeing is believing. C-I-P™, the Concentric Information Processor, is the first database software that lets you manage information VISUALLY, on-screen. What you see is what you get! No programming, no language, no commands *and* no surprises. • Create files, arrange forms, collect information and produce reports quickly. Reports look professional, the way you want them, the first time. The exact format is created by moving fields and text visually on the screen.



Don't worry about mistakes! You can change your requirements at any time! • Every field is dynamically "keyed" for rapid record selection and reporting *without sorting*; automatic computations for date differences, agings, tickler dates; help at the touch of a key. • Visit your IBM® PC dealer today for a visual demonstration. Seeing is believing. C-I-P from Concentric Data Systems, 18 Lyman Street, Westboro, MA 01581. Telephone (617) 366-1122.

The new standard for information management software.

THE WORD IS OUT FROM IDE:

"IDEAdisk offers the broadest selection of disk storage combinations for your IBM PC."



Some people think IDE stands for **I**ntegrated **D**isk **E**quipment. And they're not far wrong. Our IDEAdisk line of hard disk drives goes all the way from 5MB to 40MB fixed storage, with *removable* cartridge Winchester backup if you want it. The nice part of the removable cartridge, of course, is that when you're not using it for backup, you can use it as a regular mass storage device. Makes for much sounder economics, we believe.

For even sounder economics—ah! here it comes—we *integrate* our drives through sophisticated software with IDEAshare and IDEAnet: the only one-two punch on resource sharing on the market today. In fact, we even integrate our disks with our IDEAplus combination card—it acts as host adapter for the disk, and without using an extra slot, you can add memory, a serial interface, and clock option.

Our disks are designed to work with all our IDEAproducts as well: the IDEAmini combination card, the IDEAComm 1200 integral modem, the IDEAComm 3278 PC to mainframe communications card and the IDEAGraph family of high resolution color graphics cards. All our disks receive 100% functional testing before shipping, carry a full year limited warranty, and are backed by our unique upgrade policy.

So yes, at IDE we stand behind our Integrated Disk Equipment, but we stand for much, much, more. Talk to your local computer dealer or give us a call at **800-257-5027** (in Massachusetts, call 617-275-4430). We'll get the word to you on IDE.

IDE
IDE Associates

Better ideas for personal computers.

IDE Associates, Inc., 7 Oak Park Drive, Bedford, MA 01730

Quadmodem.TM

The intelligent way to talk to other computers.

Ordinary modems can't do what the Quadmodem can. Because they're not as smart.

If you expect your computer to communicate effectively with other intelligent systems, you can bet it'll need an intelligent modem. That's where the new Quadmodem from Quadram comes in.

Quadmodem connects directly to your phone line. From there it can dial a number from memory; detect incoming baud rates; answer the phone when another modem calls; and distinguish between dial tones, busy signals, data transmissions, and human voices (remember those?). It also automatically adjusts for rotary or Touch Tone phone systems and shows you what's happening right on your computer screen.

Even problems aren't problems.

An advanced microprocessor in Quadmodem can automatically spot phone problems, and the Quadmodem is fully compatible with Bell 103/212A dial up modems and the most popular modem brands.

Quadmodem is the complete intelligent modem: with two different versions, an internal model for IBM PC's and most compatibles and a stand-alone for the PC and other popular brands. Both come with full supporting documentation and user manuals. Plus right now, we'll include an introductory offer from The Source.TM And to round it out, you can add QuadTalk, our very powerful, highly intelligent communications software that's menu-driven and very friendly.

If you expect your computer to communicate properly, it's got to act intelligently. It can with the new Quadmodem from Quadram. See your dealer today for a demonstration.



4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

INTERNATIONAL OFFICES

Interquadram Ltd., 442 Bath Road, Slough, England SL16BB
Tel 6286-63865 Tlx 847155 Auriema G Interquadram GmbH
Fasanenweg 7, 6092 Kelsterbach, West Germany Tel 6107-3089
Tlx 417770 Seva G Interquadram s.a.r.l. 41, Rue Ybry, 92522 Neuilly
Tel 758-1240 Tlx 630842 Iso Bur Chevco Computing 6581 Kitimat
Road, Mississauga, Ontario, Canada L5N-2X5 Tel: 416-821-7600

IBM® PC XT, PCjr. are registered trademarks of International Business Machines Corporation.

*The Source is a registered trademark of Source Telecommunicating Corporation.

© Copyright 1984 Quadram Corporation. All rights reserved

Circle 149 on reader service card

"IF YOU'LL PAY FOR WE'LL GIVE YOU



An easy,
inexpensive
way

to sample ten exciting new IBM PC*
software products.

For a special introductory price of
just \$39.95, (plus \$3.00 shipping &
handling) we'll send you a box of 10
premium quality BASF ds/dd diskettes
. . . just like the ones on the right.
Great diskettes at a good price. But
what's more, on each diskette we've
copied a ready-to-run DEMO of
an IBM PC software package—
yours at *no extra charge!*

\$39.95 COVERS THE DISKETTES; THE DEMO SOFTWARE IS FREE.

We've searched industry-wide for
up-and-coming software packages—
and here are 10 of the very *best*.

Novice or expert, business
executive or programmer—simply
insert these demo disks and try out,
for *yourself*, an interesting new . . .

- dBASE II Application Generator
- Word Processor
- Spreadsheet Trainer
- Stock Investment Manager
- Communications Package
- Mainframe File Transfer Utility
- Program Development Tool
- Management Skills Aid,
- Negotiations Strategy Tool
- Disk Backup Utility

10 FULL SIZE DEMOS ON 10 DISKETTES

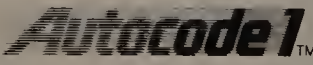
Each Preview-Pak features TEN
(10) FULL SIZE / FULL FUNCTION
DEMOS . . . complete with easy to
follow written instructions. (Recorded
double sided. Many require DOS¹ 1.1
or 2.0. Some require extra memory
and/or graphics. Many run on com-
patible machines.)

Examine them at your leisure—
under no pressure or obligation. And
when you're through, simply peel off
the demo identification labels, and
reuse the diskettes—you *can't lose!*

FEATURING BASF LIFETIME WARRANTY DISKETTES

BASF Qualimetric FlexyDisks
feature a unique LIFETIME WAR-
RANTY. (Warranty details available
from BASF.)

PREVIEW • PAK PRESENTS:

 TRANSEND Communications Software "Transend PC™" Is It the Ultimate? You'll have to See it to Believe It.	 HUMAN EDGE "The Negotiations Edge™" Develop a Negotiating Strategy with Expert Assistance.	"BACKUP MANAGER™" by  Efficiently Archives and Re-loads Hard Disk Based Systems.	 Generates Your dBASE II* Applications . . . in Minutes.	 Sophisticated Mainframe—PC Information Transfer Utility.
 SuperWriter™ By SORCIM Advanced Word Processing at Your Fingertips.	 "C-Window Debugger™" Symbolic Source Level Debugger—Displays C Source Code as it Executes.	 "Certified Personal Investor™" Your Personal Stock Market Analyst.	 ATI Training Programs™ "Spreadsheet Trainer™" Sample ATI's Interactive Training for Popular Spreadsheets.	 HUMAN EDGE "The Management Edge™" Improves your Management Skills and Employee Productivity.

THE DISKETTES, THE SOFTWARE!"

ISSUE #2
ALL NEW DEMOS

\$200.00 IN DISCOUNT COUPONS!

Inside your Preview-Pak, you'll soon discover a valuable **BONUS**. Money-saving discount coupons—\$20.00 off each featured software product plus a special offer coupon from BASF (Offers limited; U.S.A. only; void where prohibited by law.)

LIMITED AVAILABILITY

We're featuring different demo software every month, so order your **PREVIEW-PAK** *today* and start a reference library. But inventory is limited. Why delay? For quick delivery



CALL TOLL-FREE (24 Hours)
(800) 443-0100 ext. 330A

Or send check or money order for \$39.95, plus \$3.00 shipping & handling, to . . .

Preview Publishing

P.O. BOX: 590359
SAN FRANCISCO, CA 94159
Ask for Issue 2.

California residents add 6.5% sales tax. No CODs please. Orders shipped promptly by UPS—allow 2 weeks for checks to be processed. 3% added for Visa, MasterCard & American Express Card purchases. Damaged or faulty disks will be replaced at no charge. Foreign orders are welcome, please write us for details.

(*Demonstration versions only)

WHY NOT SUBSCRIBE?

If you'd like to check out new software regularly, and receive a steady supply of diskettes, contact us about our unique individual and corporate subscription programs.

Individual Subscription Plan:

Simply tell the operator you'd like to subscribe, and we'll place your name in our computer. Then approximately each month we'll ship you a different Preview-Pak, and your credit card account will be automatically billed at our prevailing advertised rate. Accept delivery or cancel at any time.

Corporate Subscription Plan:

For a **GUARANTEED SPECIAL INTRODUCTORY RATE**, please mail a company Purchase Order for 6 issues (\$257.70) or 12 issues (\$515.40). We will bill you.

ORDER TODAY!

EXTRA BONUS! Order your **PREVIEW-PAK** demo assortment **NOW**, and we'll also include our attractive **LIBRARY STORAGE CASE**—a \$4.50 value—at no extra charge! Try before you buy. Call **24 Hours TOLL-FREE** (800) 443-0100 ext. 330A—operators are waiting!



PC WORLD

Grapevine

Rumors, Tidbits, Speculation

* ————— *

Big Blue Bubbles

Is IBM coming out with a lap-size PC? An industry source says that IBM has a contract with Hi-Comp, a bubble memory board maker in Redmond, Washington. According to the source, Hi-Comp has been designing a 256K bubble memory board for Big Blue for some time. The contract could mean that IBM plans to offer a full-size bubble memory expansion board for the PC and the XT; however, a number of companies, Hi-Comp included, already produce bubble boards for the PC. It's more likely that IBM plans to incorporate the new board in a yet-to-be-announced computer.

Bubble memory is stored on chips made of garnet instead of silicon, and it is nonvolatile, so data is not lost when the power is turned off. Its nonvolatility and durability make



bubble memory an important component in small computers such as the sleek GRiD Compass and the Teleram 3000. Could the boards be headed for a briefcase-size computer—code-named the Cracker-jack? We'll just have to wait and see.

* ————— *

Too Much of a Good Thing

An anonymous correspondent tells us that IBM may have gotten more hands-on testing than it bargained for a few months back. According to our reporter, IBM recruited a group of local residents who had no prior computer experience to test the PCjr before its release. One diligent tester followed the instructions in his manual quite literally: they said to remove the disk from its protective sleeve, so he did. He held the flimsy round piece of plastic gingerly, think-

ing he'd done the right thing until he came to the next step in the instructions. It told him to grasp the disk by its top two corners and slide it into the drive. Of course this man's disk didn't have any corners. We haven't heard whether he got the floppy into the drive, but this tough consumer test may have resulted in a new picture in the PCjr's manual.

* ————— *

Disk Drive Doings

The rumors continue to fly regarding IBM's handling of contracts for supplies of hard disk drives. Although the hard-disk-equipped XT is selling well, IBM abruptly diminished its orders for 10MB hard disks from three firms—Seagate, MiniScribe, and International Memories. One source reports that IBM will continue to purchase the drives from Seagate but will not renew its contracts with MiniScribe and International Memories. The slack will reportedly be taken up by two branches of IBM—IBM Japan and IBM's manufacturing unit in Rochester, Minnesota.

Another industry source speculates that IBM will use 3½-inch disk drives in one or more of its computers this year. In addition to ordering large quantities of microfloppy drives (like those used in Hewlett-Packard's HP 150 and Apple's Macintosh and Lisa), IBM is expected to offer at least one product with a built-in 3½-inch hard disk. Could the next generation of notebook computers be on the way?

PC World View reports new developments in computer technology, items of interest to all computer enthusiasts, and the most significant and enticing speculation about industry trends and personalities. We've reserved the "Grapevine" section of this column for industry reports that are still at the speculative stage.

—Miriam Medom and
Katie Seger

View

News and notes for the computing community

You're Gonna Like Us!

Correspondent Karen Dowell investigated a new on-line travel service and files this report:

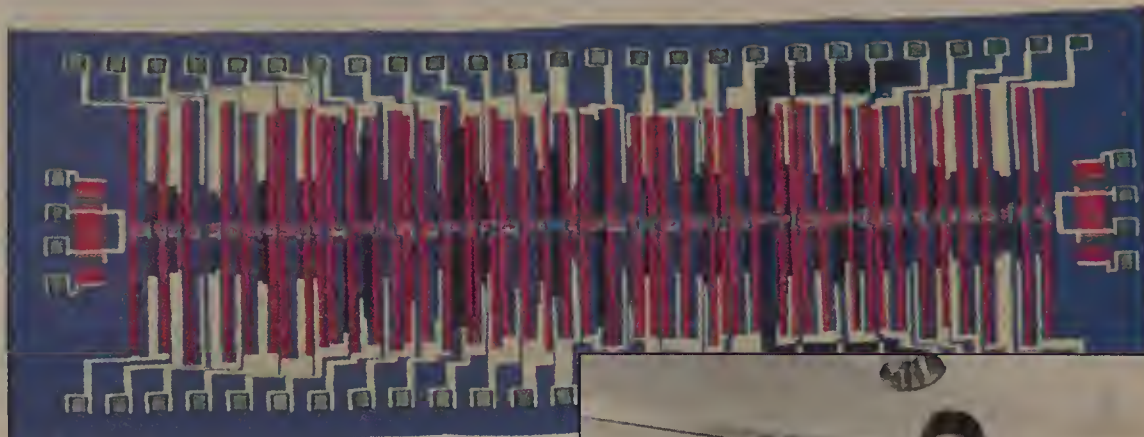
For people frustrated with travel agencies or calling an infinite number of airlines to find the right plane at the right price, there may be a light at the end of the runway. A recent agreement between CompuServe and Trans World Airlines will bring the schedules and fares straight to your PC.

The menu-driven system is slated to begin operation by October 1. The service will enable CompuServe subscribers to review flight availability, make reservations, and even buy tickets with major credit cards. The tickets will then be mailed, issued through a travel agent, or held at the airline's ticket desk for the customer.

According to Mary Vaughn, marketing manager of travel products for CompuServe, the service fills a gap in the travel communications industry by eliminating the time spent with an intermediary. Although fees have not yet been determined, Vaughn estimates that the service will cost \$20 to \$40 per hour.

"The on-line reservation system marks the direction personal computers will take in the future," according to Peter T. McHugh, a TWA vice president. "This is a significant step in extending the benefits of this advanced technology to the consumer," he states, "and we expect that we will soon have agreements with other information services."

What a Tangled Chip She Weaves



Art and technology have achieved a beautiful marriage in the microchip tapestry that graces the Honeywell headquarters.

Combining VLSI and ALU with weft and woof was easy for weaver Janet Kennedy. Kennedy's tapestry, "Circuitry," is an artistic rendition of a Honeywell thin film resistor array. The 9-foot by 3-foot tapestry (see photos) hangs in Honeywell's corporate headquarters in Minneapolis, Minnesota.

"My training is in large-scale realistic representations, but usually I do landscapes," said Kennedy, who has been a professional weaver for 10 years. She was enthusiastic about her first technology-inspired project, however. "Honeywell sent a whole stack of chips to me. Then the project manager, the interior decorator, and I got together to choose the right chip and a color scheme," she said.



Weaver Janet Kennedy (left) in her studio with assistant Iseult Caulfield

Kennedy and her two assistants sidestepped traditional weaving procedures by working from an enlarged color photograph of the chip instead of a preparatory design, or cartoon, of the planned tapestry. The wool, cotton, and linen wall hanging was finished in eight weeks.



Good Pitch—A 99-Cent Demo on Disk

PC World *was the first publication to bind in a demo disk*—Microsoft Word—but now Main Street Software has introduced an almost-free version of its data management program.

Main Street Software of Sausalito, California, has instituted a rather nifty promotion for its *Main Street Filer*, a filing program that also prints reports and several styles of name-and-address listings. Computer dealers who carry the Main Street program can get a free box of demo disks and sell them to customers for 99 cents each. The demo disk contains a full implementation of *Main*

Street Filer, but it allows only five records to be created and saved or printed.

The demo disk is packaged in an attractive printed plastic envelope, which contains the disk and a 20-page, disk-size booklet called the *Short Course for Main Street Filer*. This mini-manual introduces a few basic concepts of data management and then takes the reader through all phases of the program. The disk is an inexpensive sales tool that seems ideal for both dealer and customer: the customer gets a reusable disk for one dollar, the dealer avoids a time-consuming sales pitch to demonstrate the program, and (in theory, anyway) at least some people who try the demo will purchase the program.

If you can't find a dealer who has the demo disk, contact Main Street Software, One Harbor Dr. #304, Sausalito, CA 94965, 800/824-8757, 415/332-1274.

Little ROMance for PCjr

Following the introduction of the PCjr, several industry writers suggested that software manufacturers would put best-selling programs on ROM cartridges. Such ROM-based software wouldn't take up any of the computer's limited 128K RAM or floppy disk storage. But so far the PCjr hasn't sold very well, and most software firms are waiting to see if the sales pick up before they commit to such a software conversion.

One exception is Lifetree Software, which brought out a cartridge version of *Volkswriter Executive* this summer. According to Lifetree president Camilo Wilson, his company spent \$30,000 on research and development of the product, but he stressed that "we didn't put all our eggs in the PCjr basket." While acknowledging the cautious attitude of his software rivals, Wilson doesn't think Lifetree took a gamble. "The PCjr has some problems—the keyboard for example—but we know who stands behind the computer. IBM won't take a bath with the machine. IBM will make the changes it has to make," he said.

Wilson's optimism notwithstanding, PCjr sales have not been brisk. In fact, some dealers are giving the term "bundling" a new meaning by throwing in a free PCjr with every XT sold.

Big Blue's News

* ————— *

Garbage Out, Garbage Out

The Entry Systems Division of IBM, which operates the main assembly plant for the PC and the XT, has found a solution for a manufacturing problem that most people don't think about much—trash. As part of its overall drive for efficiency in order to meet the booming demand for PCs, IBM has accelerated production of the computer to one machine every 16 seconds, and that rate will increase to one every 7 seconds by year's end. But what about the boxes and plastic wrappers that protect all the parts going into a PC?

At the increased rates of production, workers would be knee-deep in debris if they had no place to send the garbage. So IBM designed a trash collector that is installed above the production line. Workers throw trash into the device, which is essentially a long basket on a conveyor belt. The basket whisks the wrappings away and the worker is presented with an empty section of the basket by the time he or she has liberated more litter.

* ————— *

The Brit-Mail Contract

IBM's British telecommunications unit has scored a nice coup—selling its 1750 series of electronic exchanges to the British Postal Service. The precise value of the contract wasn't disclosed (the British are almost as reluctant to talk about money dealings as IBM), but this is known to be a multimillion-dollar deal.

In Britain the post office also provides phone service, and the 27 IBM exchanges will transmit both voice and data to some 130 regional post offices. One component of the new service will be a facsimile-transmission service, rather like a high-quality, long-distance copier.

The 1750 series of exchanges is marketed only in Britain and Europe. The British post office chose the IBM equipment over competing hardware offered by General Electric, Harris Corporation, and other major telecommunications suppliers.

Building a Better Chip



Potatoes seem to figure prominently in *PC World View* lately. We recently reported that the Washington State Potato Board was none too happy about Microsoft's "junk food" ad showing a bag of french fries. Now we've heard from correspondent Rollin Moseley that one kind of chip is designing another kind of chip. Rollin's report follows:

Always in search of a better potato chip, Frito-Lay, maker of Ruffles, turned to computers to design a new super dip chip. In pursuit of this goal, Frito-Lay has introduced O'Grady's chips, which have ridges that are proportioned mathematically to give optimum crunch and flavor without bulk.

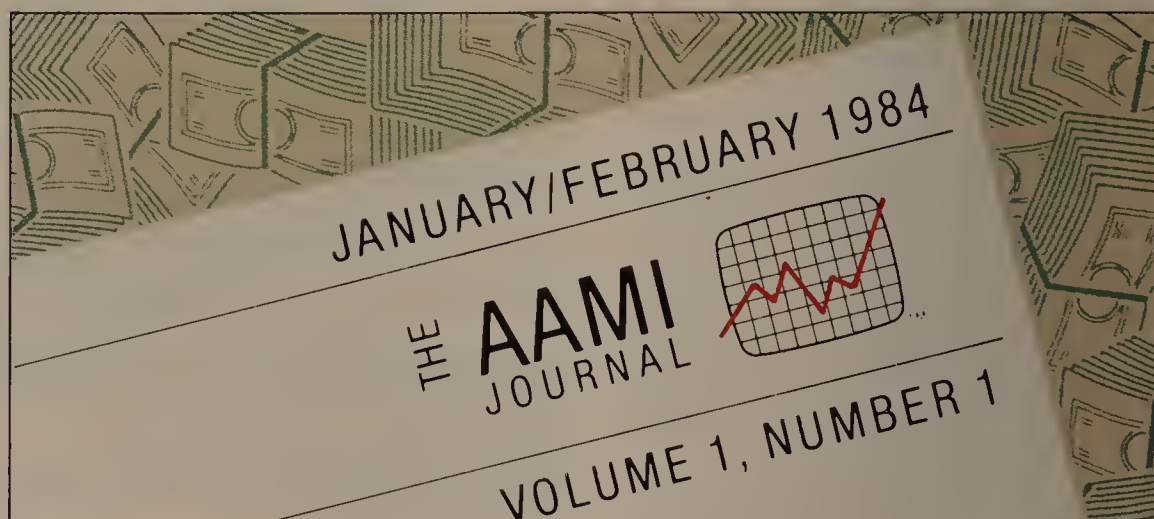
On other potato chips, the ridges on the top and bottom are synchronized. On the chips that microchips built, the bottom ridges are



Investment Update

On-Line Advisor

On-line investing continues to fascinate microcomputer owners, and now there's a group that offers advice, software reviews, and discounts on programs for electronic traders. The American Association of Microcomputer Investors publishes a bi-monthly magazine, *The AAMI Journal*, which offers free investment-related software to members and maintains a directory of commercial programs related to investing. Annual membership is \$49; a sample is-



sue of the journal is available for \$3. For more information contact Thomas Meyers, AAMI, P.O. Box 1384, Princeton, NJ 08542, 609/921-6494.

and locate the best price for that stock. Then it will put the transaction on hold for 30 seconds, while still checking its listings in case a better price is offered during that interval. If not, the purchase is made.

Not only does Instinet take advantage of the computer's data-crunching abilities to find the lowest price, but it also has a built-in form of democracy. If more than one trader is offering the lowest price for a stock, the Instinet software automatically rotates orders among the traders selling at that price.

PC World View *welcomes contributions from readers, and we'll pay up to \$50 for the items we use. Please include your name, address, and phone number with your contributions; send them to PC World View, PC World, 555 De Haro St., San Francisco, CA 94107.* ●

Building a Better Chip (continued)

shifted slightly to the right, making the up-slope slightly thicker than the down-slope. The thick portions provide the flavor, while the thinner ones provide the crunch.

In the United States, big bucks rest on those ridges: Americans chomped \$2.54 billion worth of potato chips in 1982. Frito-Lay, which leads all other (potato) chip makers in sales, put 200 scientists and engineers to work for two years to develop O'Grady's. If they're a hit, 'the chip shortage' could take on a whole new meaning.

Bankers' Best Buys

Instinet is a stock-trading system that has specialized in serving institutions such as banks and insurance companies. Recently, however, Merrill Lynch bought a small chunk of Instinet (about 8 percent), and the brokerage firm plans to offer Instinet to its brokers and customers next year. (The Instinet software and service will be integrated into the network of PC-based work stations that Merrill Lynch is currently developing in partnership with IBM.)

The reason that Instinet has suddenly become hot property is its unique trading system. The service offers 3500 stocks listed on the major exchanges or available over the counter. Traders can order up to 1000 shares of any stock, and Instinet will rapidly poll its data base

When Lotus™ wanted better graphics for 1-2-3™, they chose a better graphics card—HERCULES.



And then we became a standard.

When the IBM® PC was introduced over 2 years ago, the talented people at Lotus realized that it was limited by a lack of high resolution graphics. They knew that this was going to have an adverse effect on 1-2-3's graphics. And Lotus didn't want anything to hold back their revolutionary software.

So they turned to Hercules.

Lotus recognized that the Hercules Graphics Card delivered the performance they wanted. It offered high quality text and high resolution graphics on IBM's monochrome display. It completely replaced the IBM monochrome card. And it didn't cost an arm and a leg.

Since then, Hercules has sold a lot of Graphics Cards. So many that the Hercules Graphics Card has become the high resolution standard for the IBM PC. And this means that there is more high resolution graphics software available for Hercules than for any other graphics card you can buy.

Software like Microsoft® Word. Our high resolution makes Word's text much sharper and easier on your eyes. And there are other programs for business graphics, computer aided design, terminal emulation and programming.

Call for our free information kit. See why the company that made the first graphics card for the IBM PC still makes the best.



Hercules. We're strong on graphics.
800 255 5550 Ext. 401

Address: Hercules, 2550 Ninth St, Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063 Features: IBM monochrome display graphics resolution of 720x348; parallel printer port; text mode software compatibility; free software for programming; 2 year warranty. Foreign distributors: Compuserve/Canada; Reflex/U.K.; Computer 2000/W. Germany; Edisoft/France; SourceWare/Australia. Trademarks/Owners: Hercules/Hercules Computer Technology; Microsoft/Microsoft Corp; IBM/International Business Machines; Lotus & 1-2-3/Lotus Development.

Digital Research introduces the complete graphics art studio for desktop computers. Featuring our remarkable family of three presentation graphics applications.

Digital Research DR Draw,[™] which runs on the IBM[®] PC and compatibles like the TeleVideo Tele-TC,[™] does for visuals what word processors do for text. Using a mouse or keyboard, you draw by menu. Create organization charts and illustrations. Move, copy, scale, restyle and store. Even print or plot.

Digital Research DR Graph[™] lets you compose graphs, charts or text and transform them from a spreadsheet. Then convert to paper or acetate with printers like the Diablo Ink Jet Color Printer.[™]

Until today,
all he
could draw
was
a salary.

Or make stunning slide presentations with the Polaroid Palette.TM
For sophisticated graphics there's Digital Research Access 10.TM
It lets you re-create, print or plot by tapping into a mainframe.

No matter how demanding your business graphics needs,
Digital Research can help. Easily and economically. It's all in
our family of compatible software for the IBM[®] PC.

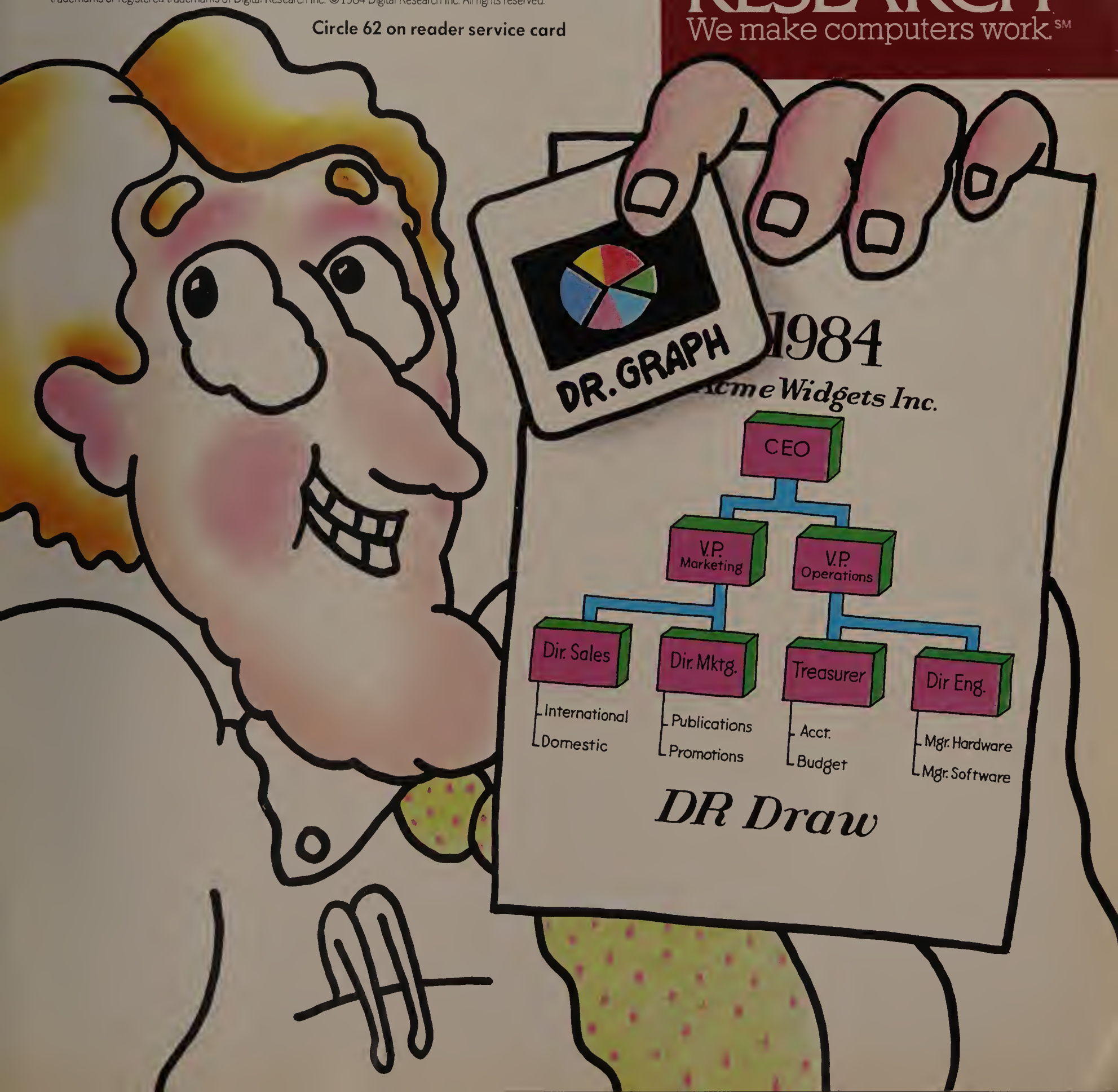
To find out how we can work for
you, call 800-227-1617, ext. 400.

In California, 800-772-3545, ext. 400.

The products and corporate logos referred to herein may be trademarks or registered trademarks of the companies indicated. Preliminary versions of DR DRAW were acquired from TeleVideo Systems, Inc. The Digital Research logo and products are either trademarks or registered trademarks of Digital Research Inc. ©1984 Digital Research Inc. All rights reserved.

Circle 62 on reader service card

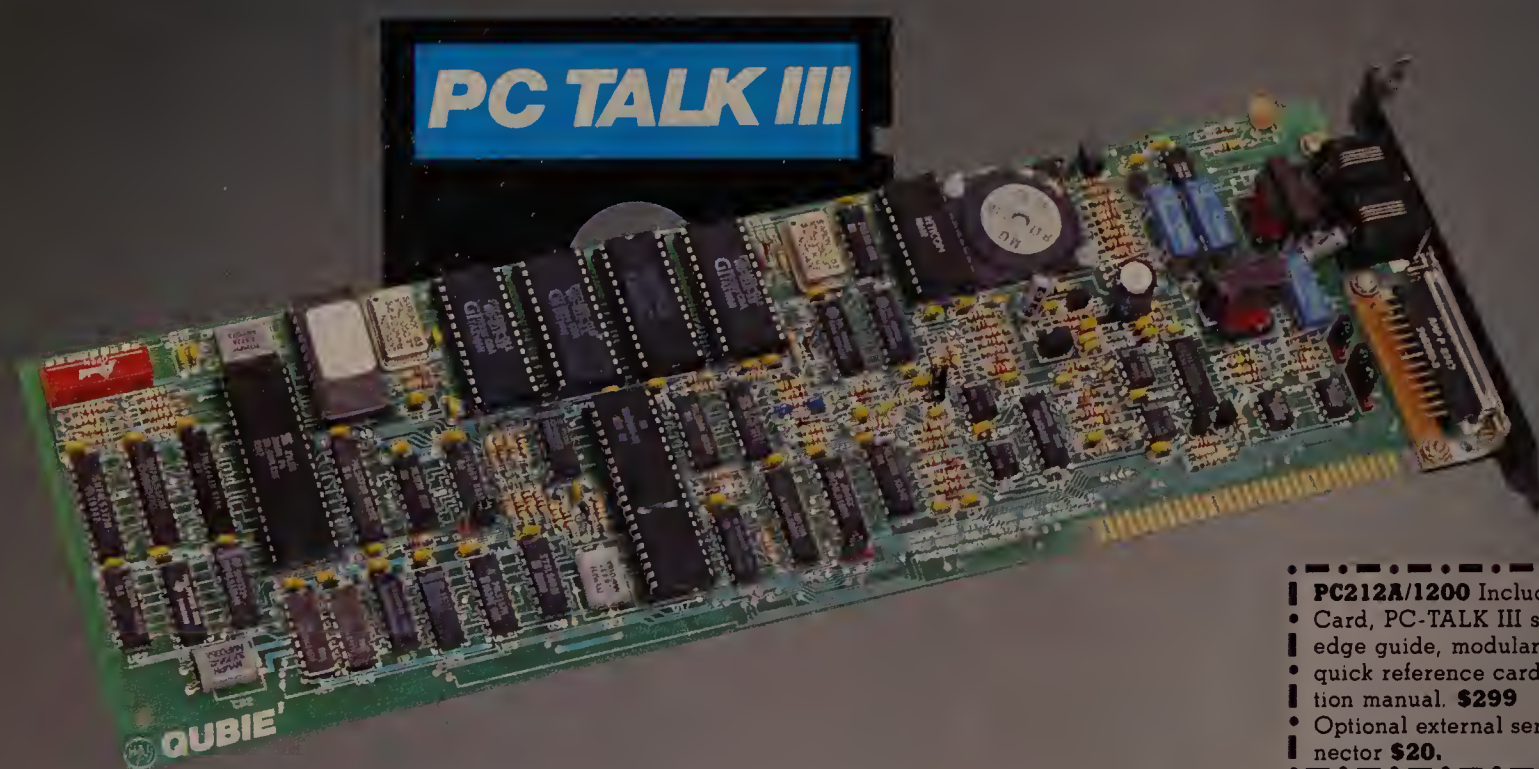
 **DIGITAL
RESEARCH[®]**
We make computers work.SM



Thinking of
buying a

modem? You owe it to yourself to check

Inside



PC212A/1200 Includes: Modem
• Card, PC-TALK III software, card
• edge guide, modular phone cable,
• quick reference card, and instruc-
• tion manual. **\$299**
• Optional external serial port con-
• nector **\$20.**

Just a few years ago, computers needed big air-conditioned rooms to operate in, balefuls of money to buy, and a team of wizards to keep them running. The constant march of technological progress has given more and more powerful machines which cost less and less. Desktop computers more powerful than the early mainframe computers are the result of the evolution. The Qubie' modems represent the latest extension of this progress. Because up until now, a 212A compatible modem cost at least \$500. Through the use of four low-cost, state of the art microprocessors, we can now offer two versions of our full featured 212A modem at prices the competition sells 300 baud modems for.

In The Beginning

In September of 1983 we introduced the first 212A

modem card for the IBM PC available for under \$300. The PC212A/1200 is a complete communications package including PC-TALK III software, modular phone cable, card edge guide, and instruction manual. The modem is an auto-dial, auto-answer type, which uses all the Hayes software commands so it can be used with any of the popular software packages including Crosstalk[™] and Smartcom[™].

We picked the best software package we could find based on it's ease of use and features, PC-TALK III. Our modem includes features the old industry standard missed out on. Like being able to fit in one slot in a Portable PC or PC/XT. Or an optional connector to use the modem's serial port when not using the modem. Of course the topper is the \$299 price, hundreds less than the competition.

Our standalone modem, the 212E/1200 can be used with any computer or terminal with a RS-232C serial port. You can use any Hayes compatible communications software on anything from an Apple to a Zenith. Many owners of IBM PC's are using it because they lack available expansion slots, or have more than one computer they want to use their modem with.

It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing

Outside

out the Qubie' 212A modems.

212E/1200 Includes: Standalone modem with cable (specify male or female), modular phone cable, and instruction manual. **\$329.**



what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

Four Hearts

The heart of the Qubie' modems are four digital signal microprocessors. Two handle sending, and two do the receiving. Rather than attempt to filter all but the relevant tones used for modem communications, the microprocessors measure the tones digitally. This allows them to overcome line noise and static better than analog filter based modems.

Why Buy From Qubie'

Because you will get a prod-

uct as good or better than any available, pay less for it, and get factory direct help if you need it. If at any time during the one year warranty period your modem should require service, we will fix it or replace it within 48 hours. Notice also there are no hidden charges in our prices. No extra for freight, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just \$5 extra. If you are like many who say, "Nah, it's too good to be true," just apply the acid test and find out. Then you will be asking yourself, "Why should I pay what these modems used to cost?"

The Acid Test

Qubie' gives you a 30 day satisfaction guarantee on your modem. If you are not completely satisfied we will refund the entire amount of your purchase including the postage to

return it. If you can, get anyone selling another modem to give you the same guarantee. Buy both, and return the one you don't like. We know which one you will keep.

IBM is a trademark of International Business Machines Corporation.
Crosstalk is a registered trademark of Microcom Inc.
PC-Talk III is a registered trademark of The Headland Group.

Order Today, Shipped Tomorrow!

All prices include UPS surface freight and insurance. Add \$5 for two day air service. For fastest delivery send certified check or credit card. Personal checks take 18 days to clear. Calif. residents add 6% sales tax. Corporations and Institutions call for purchase order details.

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
Camarillo, Ca. 93010

Tempo House, 15 Falcon Road,
London SW11 2PH, United Kingdom

Copyright Qubie' 1984

Circle 605 on reader service card



Presenting a marvelous case for packing-up all your accounting software cares and woes.

Attache Accounting Software has been flawlessly designed to provide you with effective financial solutions.

Thoroughly Tested

Developed for small to large companies, Attache Accounting Software has been extensively tested in the United States and Australia and is acknowledged to be bullet-proof. Yet, for all its power and versatility, it is easy to install and easy to use.

Programmed For Growth

Amazingly flexible, it is sensibly designed with "turn-on/turn-off" options to help meet your company's expanding needs.

Attache modules can be purchased separately or as an integrated system. Modules include: Accounts Receivable, Invoicing/



Sales Analysis, Inventory, Accounts Payable, General Ledger, and Payroll.

Software To Go

Everything you require to run your accounting system is packaged inside our attractive Attache Case.

CPA Support

Recognized by leading microcomputer manufacturers as

the ultimate in accounting software, Attache has also earned the recommendation and support of major CPA firms.

End User Training

"Hands-on" instruction is available from a nationwide network of community colleges.

For more details, visit your nearest Attache Software dealer or write: Attache Software Inc., 4251 Plymouth Road, Ann Arbor, Michigan 48105. (313) 663-1166.



Attache

Attache Software Inc.

Accounting software that carries you far into the future.

The New Generation In Word Processing...

is newer than ever!



OfficeWriter™

Office Solutions introduces more advanced features for the office environment. We've combined exceptional power and simplicity to bring you a word processor for the IBM PC and XT that makes sense.

It's the easiest to learn and most natural to use of all word processors available. OfficeWriter is patterned after dedicated systems such as Wang, Lanier, and the IBM Displaywriter. OfficeWriter is the type of high caliber word processing that business expects.

And we've just added 22 advanced features to make managing your paperwork even easier. Now you can do everything from right justification to data base interface.

Our on-line (on-screen) tutorial shows you how to put OfficeWriter to work immediately. There's no need to memorize complicated command sequences; all commonly used functions are labeled on our function key template.

OfficeWriter's careful human engineering lets you concentrate on writing instead of operating your word processor. Our dynamic screen formatting constantly adjusts your text, so what you see on the screen is what you'll get on paper.

If you do have a problem, our context sensitive "Help" screens provide information specific to the function you're using.

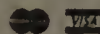
We're so certain that you'll be pleased with OfficeWriter that we'll give it to you for a 30-day trial. Make your office more productive for only \$325, and we'll include our powerful mail merge capability.

Our product support is just as good as our products. Our customers receive prompt telephone support and free updates for six months. So ask for OfficeWriter at your local computer dealer, or call us to see the difference a new generation can make.

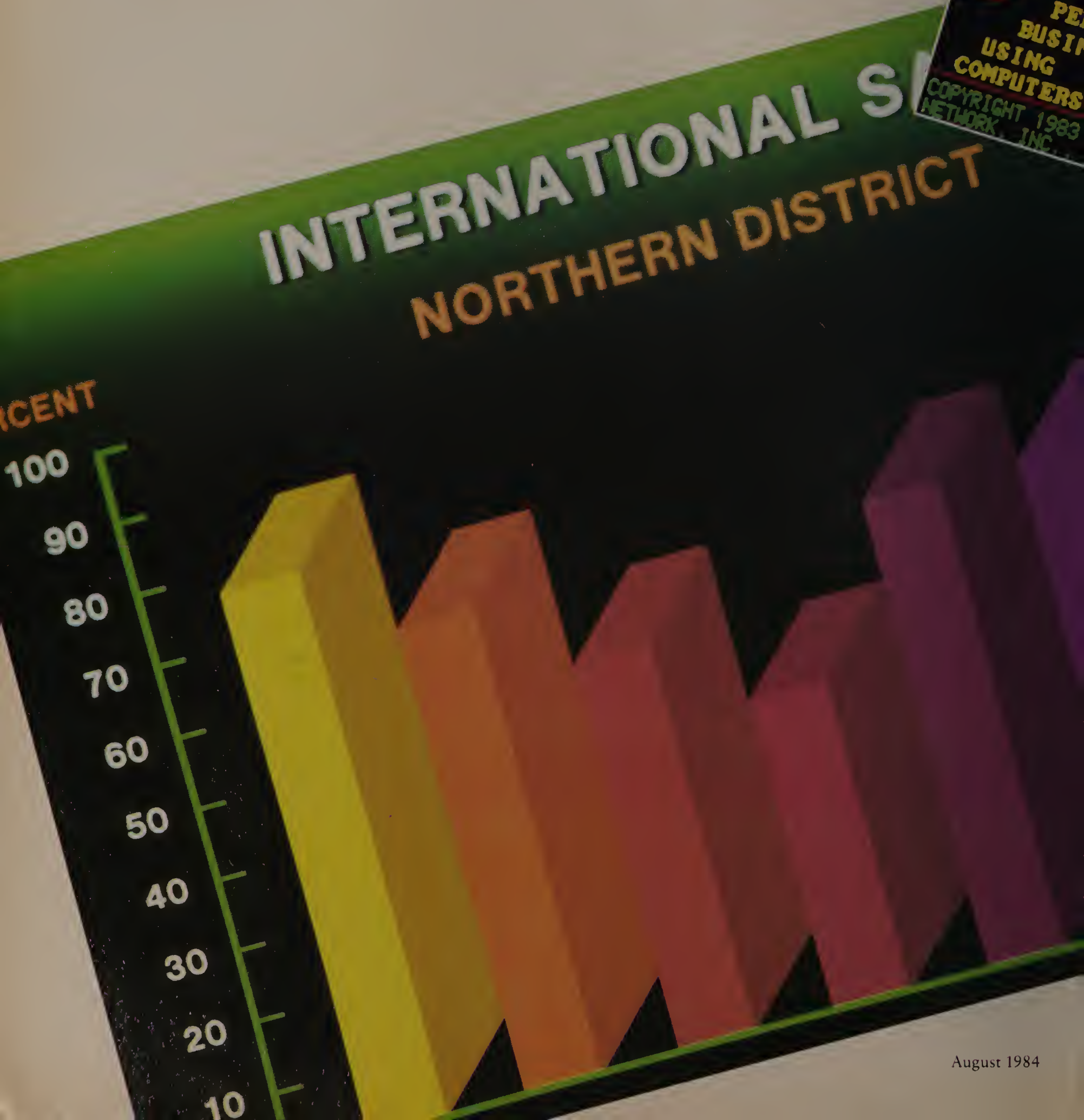
Office Solutions

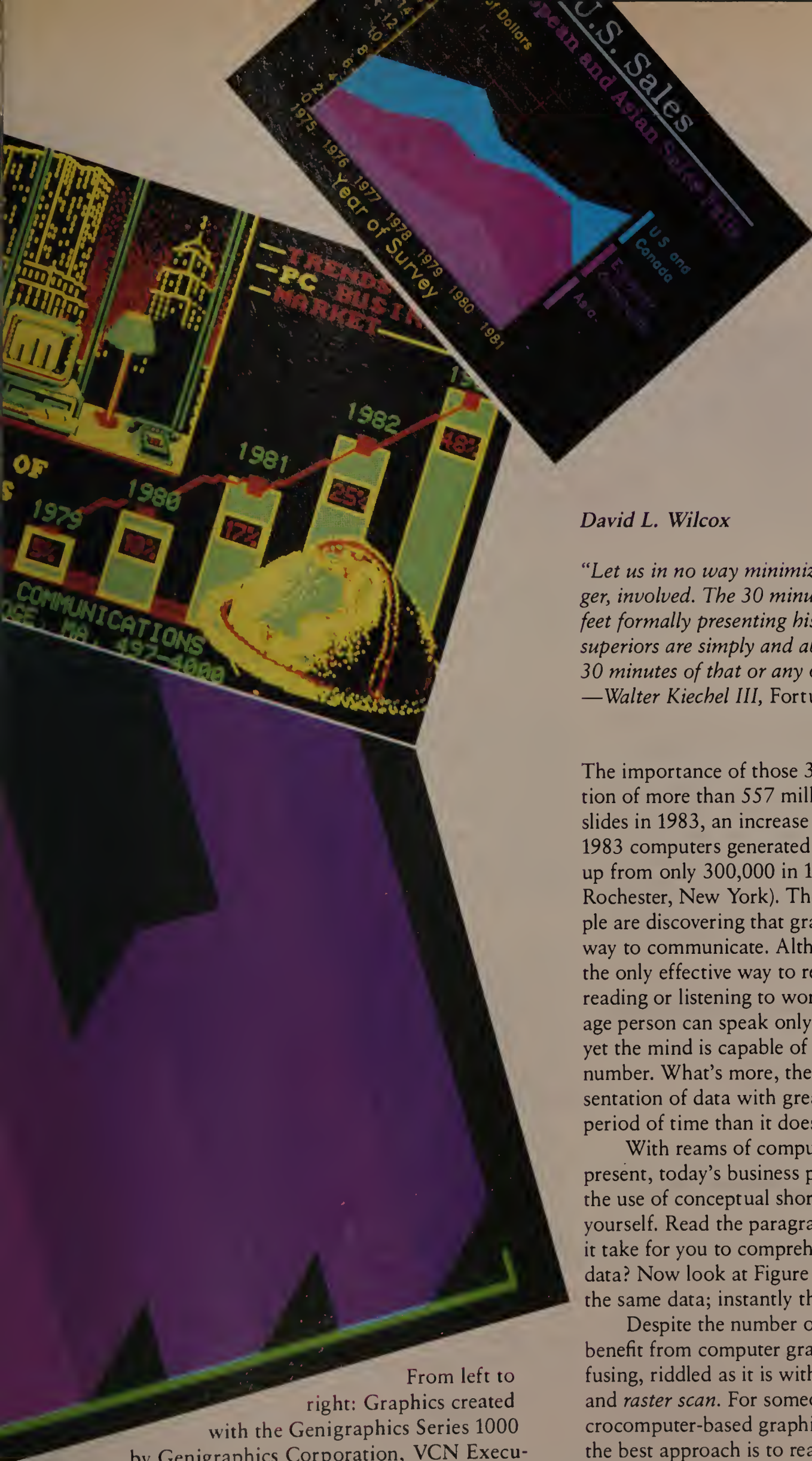
IBM is a trademark of International Business Machines Corp.
Lanier is a trademark of Lanier Business Products Inc.
WordStar is a trademark of MicroPro.
Wang is a trademark of Wang Labs Inc.

Office Solutions
5708 Odana Road
Madison, WI 53719 (608) 274-5047



The Boom in Business Graphics





David L. Wilcox

"Let us in no way minimize the opportunity, or the danger, involved. The 30 minutes an executive spends on his feet formally presenting his latest project to corporate superiors are simply and absolutely the most important 30 minutes of that or any other managerial season."

—Walter Kiechel III, *Fortune* magazine

The importance of those 30 minutes led to the production of more than 557 million business presentation slides in 1983, an increase from 263 million in 1978. In 1983 computers generated 16 million of those slides, up from only 300,000 in 1978 (Hope Reports, Inc., Rochester, New York). The pattern is clear: businesspeople are discovering that graphics are a quick and efficient way to communicate. Although the written word is often the only effective way to relate complex information, reading or listening to words is a slow process. The average person can speak only 110 to 120 words per minute, yet the mind is capable of understanding many times that number. What's more, the mind retains a visual representation of data with greater accuracy and for a longer period of time than it does a written equivalent.

With reams of computer printouts full of data to present, today's business professional is crippled without the use of conceptual shortcuts. Try an experiment on yourself. Read the paragraph in Figure 1. How long does it take for you to comprehend the significance of the data? Now look at Figure 2, a graphic representation of the same data; instantly the trend is clear.

Despite the number of professionals who would benefit from computer graphics, many find the area confusing, riddled as it is with jargon like *resolution*, *pixels*, and *raster scan*. For someone who needs to evaluate microcomputer-based graphics for his or her organization, the best approach is to read the literature and learn the jargon. However, the technology barrier can be sidestepped by finding the answers to some basic questions.

From left to right: Graphics created with the Genigraphics Series 1000 by Genigraphics Corporation, VCN Executive Vision by Prentice-Hall, and the VideoShow System by General Parametrics Corporation

Compuco's After Tax Operating Income was between \$235 and \$300 million in the first 2 quarters of 1981 prior to the acquisition of Flodata. Since then quarterly income from Compuco's traditional business has declined steadily to a level just over \$100 million in the 3rd quarter of 1982. With quarterly income ranging between \$140 and \$240 million, Flodata has more than doubled Compuco's After Tax Operating Income during the first three quarters of 1982.

Figure 1: Text chart. Compare the time it takes to read and understand this paragraph with the time it takes to comprehend the message in Figure 2.

Why Use Graphics?

Computer graphics can be used in a variety of ways, including for artistic expression and CAD/CAM (computer-aided design and computer-aided manufacturing). However, the dominant use of computer graphics is to represent data in a readily understandable, visual format. Data representation can be used for a wide spectrum of applications. For example, stock analysts and brokers could view stock price and volume charts on a real-time basis from a central data base, or a soft drink company might want to present sales and advertising plans for a new soda to its bottlers (see Figure 3).

Today's business professional is crippled without the use of conceptual shortcuts.

The verbs used in these two examples—*view* in the first and *present* in the second—are indicative of two fundamentally different requirements for data representation. In the case of the brokerage house the objective is to use computer graphics as a window into large volumes of data, as an aid to the viewer in extracting information. Due to the widespread use of spreadsheets and data base management applications, this type of analytical graphics is generally the most prevalent graphics application for PC users.

The soft drink company, on the other hand, is using presentation graphics to communicate a series of messages to an audience. Although often classified together, analytical graphics and presentation graphics place different demands on a graphics system. Understanding those demands and the extent to which PCs in your organization will be used to do each type of application is a good starting point for evaluating graphics hardware and software.

What Graphics Are Needed?

Since the news media has long recognized the value of business graphics, most of us are familiar with bar charts, pie charts, and line charts, yet we may not know the best one to use in a particular instance. These chart types can be linked directly to a spreadsheet, a data base management system (DBMS), or an integrated package such as 1-2-3. These three types compose a core group of graphs that will suffice for most analysis applications. The wave of integration currently sweeping the software business will result in the addition of basic analysis graphics to most spreadsheet and DBMS packages.

In contrast, business graphics prepared for presentation use a wider range of graph types. Figure 4 identifies the chart types most commonly used in a presentation environment. The two most frequently used chart types—line and vertical bar graphs—are predominantly

THE FLODATA ACQUISITION RESCUED COMPUKO PROFITS

After Tax Operating Income in Millions

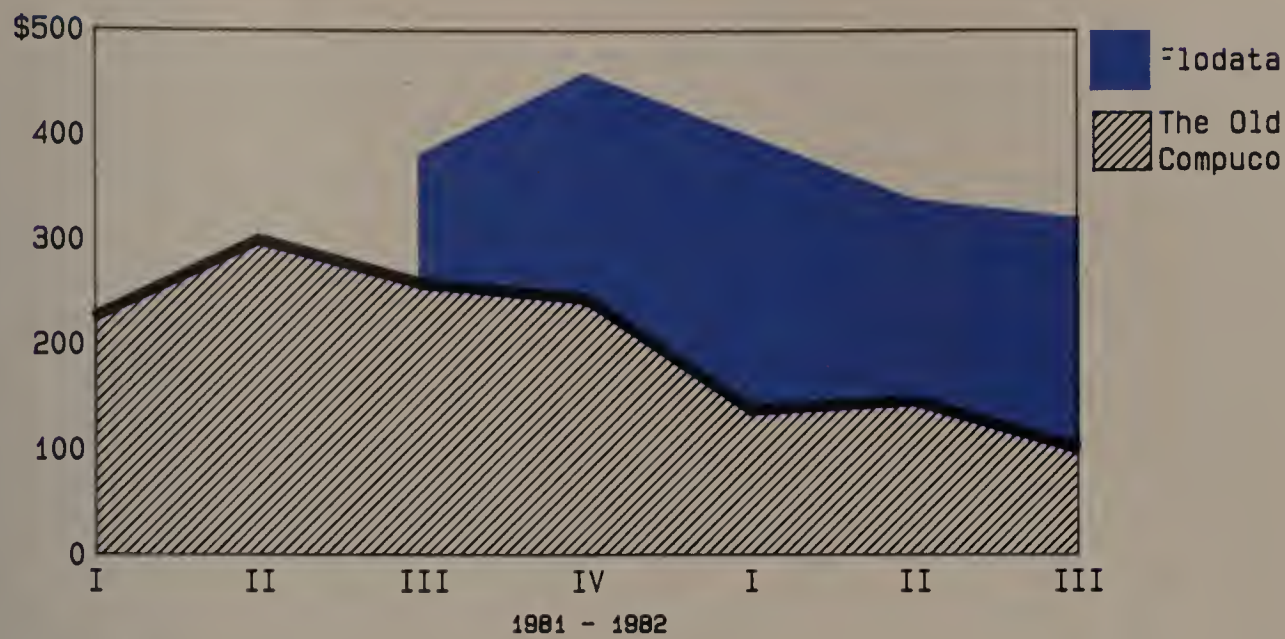


Figure 2: Multiple area graph. The message is the same as in Figure 1, but the trend can be comprehended in a fraction of the time.

Created using Graphwriter

Advertising and Promotion Schedule

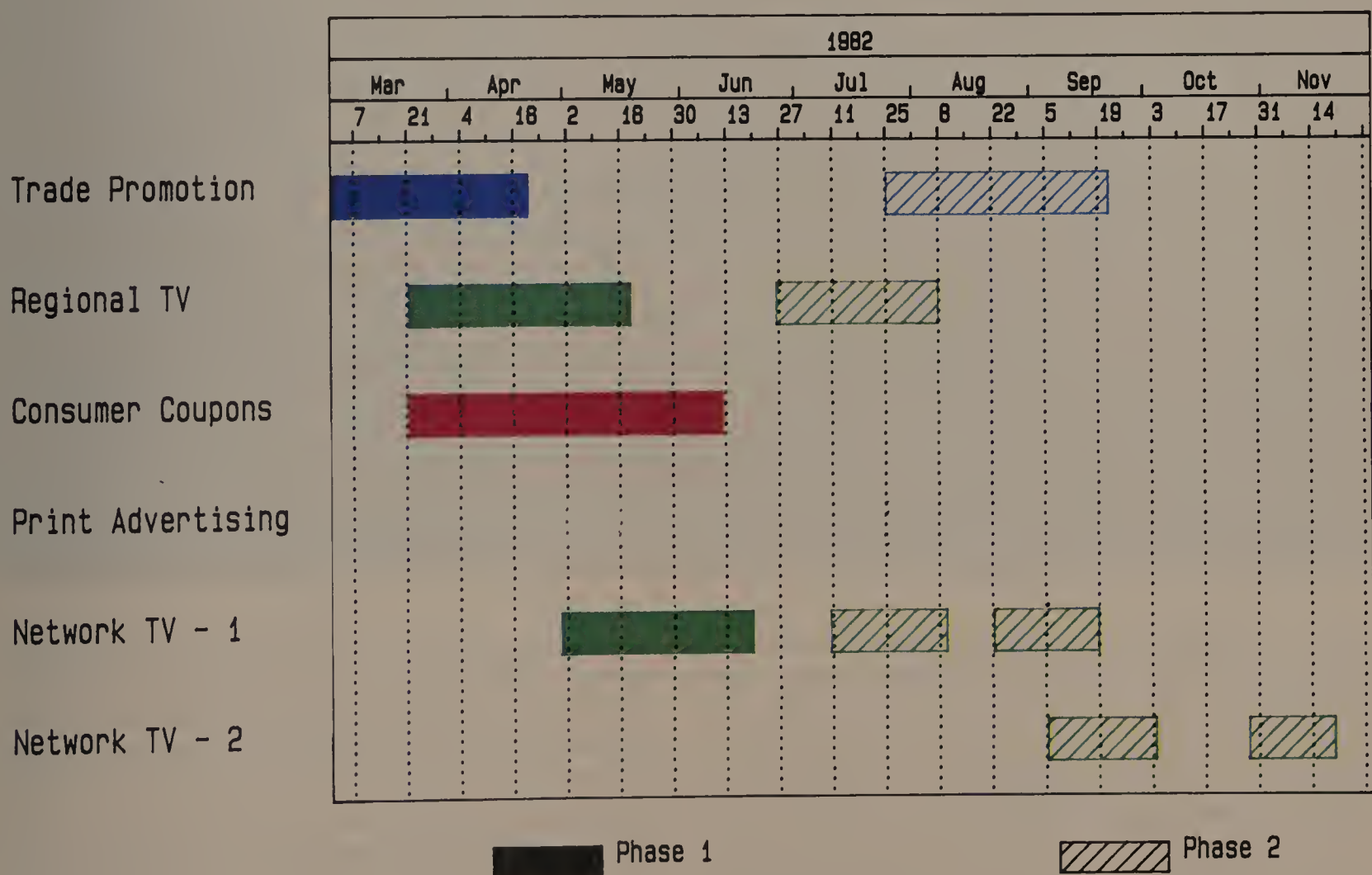
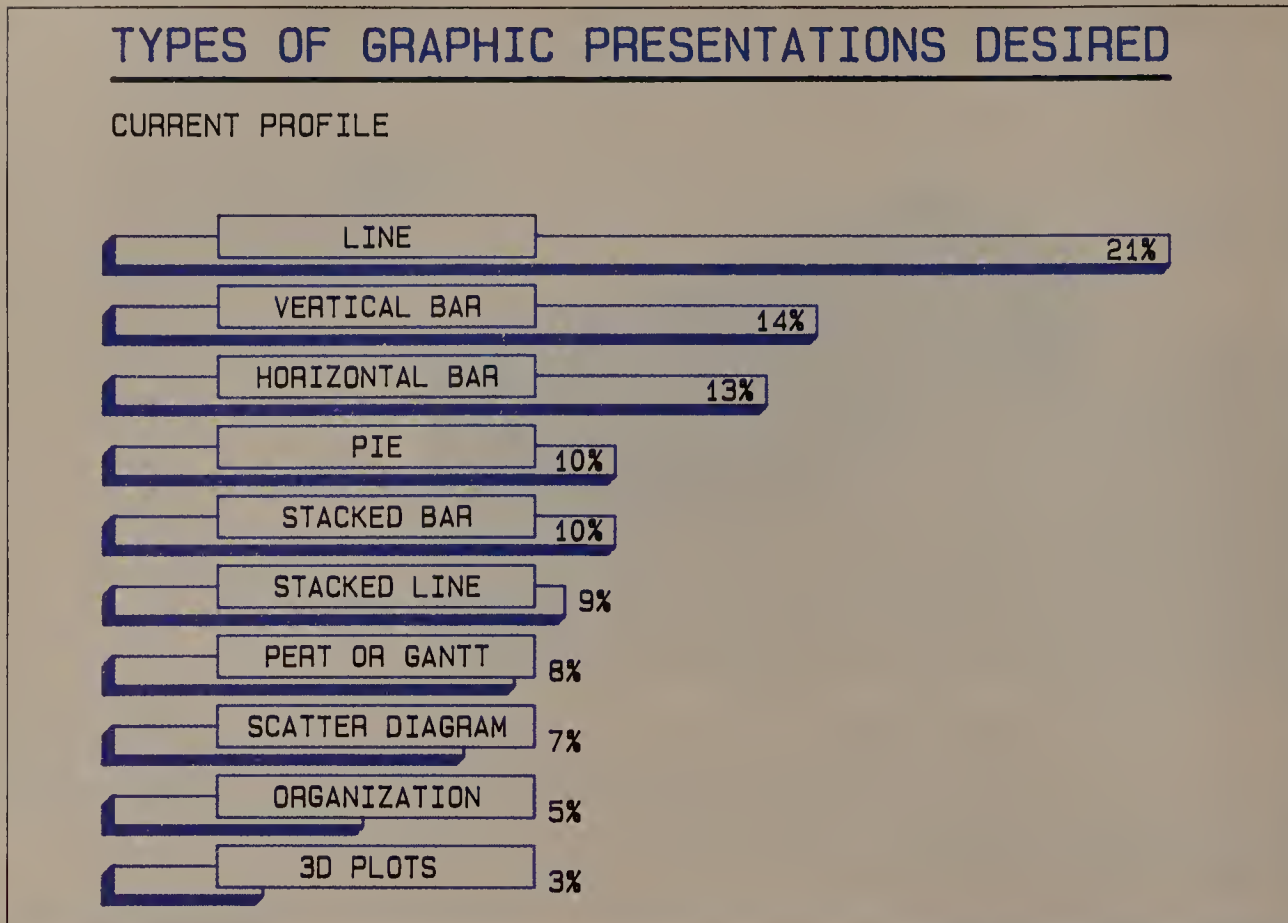


Figure 3: Gantt chart. Gantt charts are used for scheduling multiple activities over time.



Created using Genigraphics Series 1000

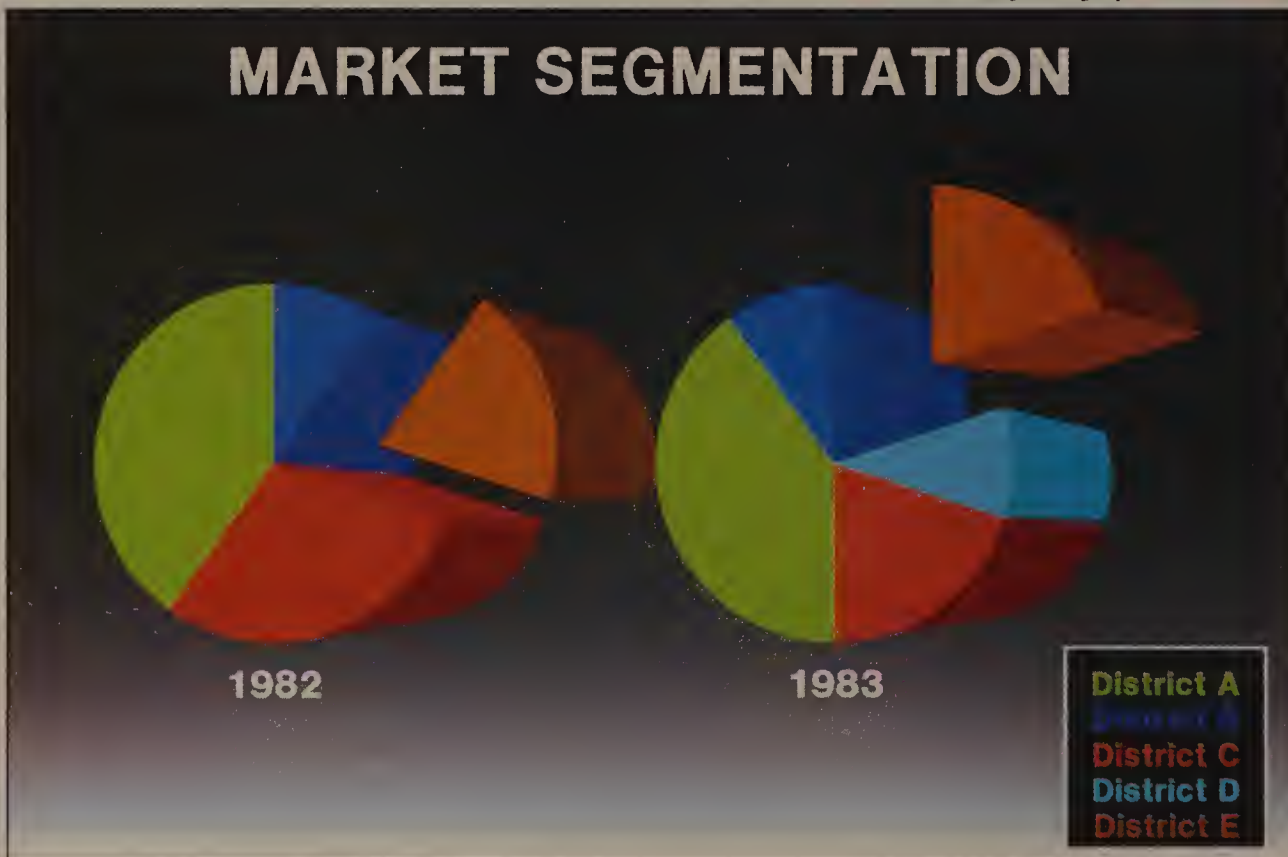


Figure 4 (top left): Horizontal bar chart. Line, bar, and pie charts make up the majority of graph types used in presentations.

Figure 5 (right): Three-dimensional bar chart. 3D can add impact to a simple bar chart.

Figure 6 (bottom left): Multiple exploded pies. Dissecting and exploding pieces of the pie concentrates the viewer's attention on the point you want to make.

used to show data over time. Non-time-oriented presentations (such as Figure 4) most frequently employ horizontal bars. Some graphics programs allow you to present bar charts in a three-dimensional format (see Figure 5).

While a single pie chart may be adequate for analysis, presentation of that analysis often requires multiple pies with proportional sizing, slices that are highlighted or "exploded," and the ability to rotate to a desired position (see Figure 6). These customizing features are the domain of presentation, not analysis, graphics software.

3 QUARTERLY PROFITS



Note that several nonanalytical formats, such as organization charts and Gantt scheduling charts (for example, the chart in Figure 3) appear lower on the list in Figure 4. Although they are not as commonly used as other formats, they are unique and have no substitute. Many presentations cannot be prepared without them. Figure 4 does not include the most frequently used format—the text or word chart.

The intensive use of text in presentations is a factor often overlooked in selecting a computer graphics system for presentations. Many presentations would also benefit from the use of a freehand drawing capability. Although this area is not easily converted to a computerized application, the freehand graphics capabilities in the Apple Lisa and Macintosh are indicative of the types of programs that will be added to presentation graphics products in the future.

Most Managers Do Not Prepare Their Presentations Instead They Are Prepared By Support Staff

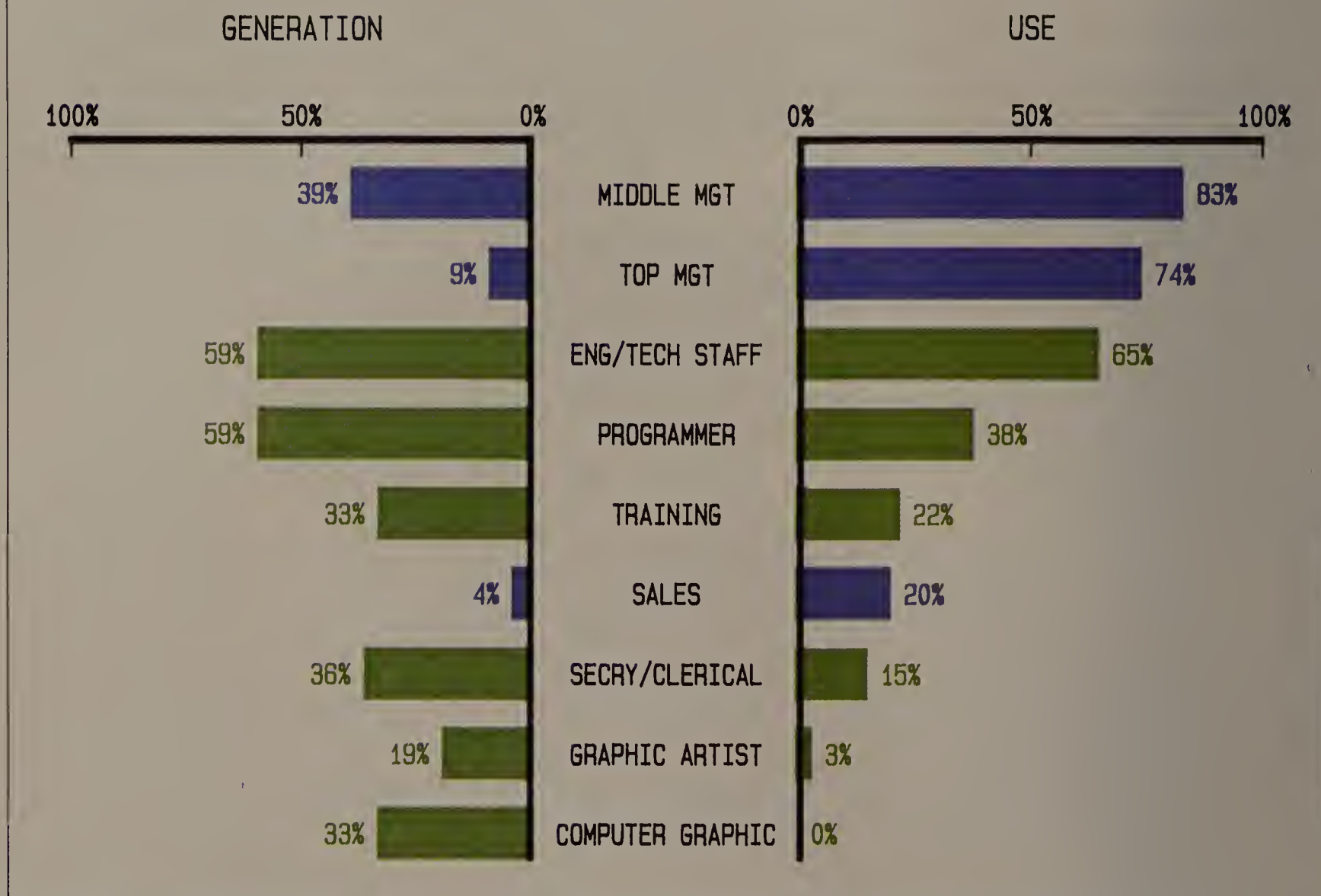


Figure 7: Double horizontal bar charts. Consider who will be creating and viewing computer graphics.

How Do I Select a Graphics Package?

Defining the audience for your graphics is probably the most important step in deciding which system to choose and how much money you should spend. Failure to address this question thoroughly can invalidate your investment. First decide whether you need analysis graphics, presentation graphics, or both. Then identify those systems that offer the necessary charting and text capabilities.

You should also consider who will be using the system. If you only have yourself to consider, the process is easy—buy what you want. However, in the typical office presentations are prepared by a subordinate for review

by the author and his or her peers and superiors (see Figure 7). If there will be more than one user, you should show samples from various graphics systems to key users. Even if you make the final purchasing decision alone, employees and co-workers can offer valuable input and point out problems you might have missed. Show screen displays and hard copy output to the team that will use analysis graphics and show hard copy and color slides to those who frequently give presentations.

In addition to securing the endorsements of users, make sure the packages you are evaluating offer the necessary output options. Output options include slides, transparencies, paper (hard copy), horizontal and vertical plots, oversize output, multiple charts per page, integrated text and graphics, and color. Most systems do some of those better than others and some not at all, so a list of priorities is helpful.

To encourage everyone in your organization to use a graphics program, you will probably want to buy software with a menu-driven approach and on-screen help. Typing a letter should not require the use of a manual, and the same should be true of creating a simple graph. A couple of products on the market provide fill-in-the-blanks input forms that can be used to guide an operator through the production of a chart.

Editing, storing, and retrieving charts should be simple, and the program should be flexible. You should be able to move quickly to any graphic or text element and make changes. If all data entry must be completed before a change can be made, the time needed for corrections increases dramatically, and so does the probability of error.

One irritating problem with most graphics software is the limited number of characters allowed for text and legends. The presenter should not be forced to use abbreviations that need to be explained verbally. Each chart should include sufficient information to stand on its own.

While refining or updating a graph, you will frequently need to make changes in the size, color, and location of the text. While analytical systems typically offer little or no flexibility in these respects, these customization features are becoming more common on presentation systems. The most sophisticated systems on the market today can adjust the layout of the text and the graph areas automatically. The ability to preview the graph on screen is another important feature, and the ability to produce a fast hard copy proof is useful, especially if an author is not producing his or her own charts.

Documentation for a graphics package should include a catalog of available charts. System capabilities should be communicated by pictures, not prose. If your graphics package does not include a chart book, make one and give copies to every presenter. All the system's users should understand what the system can and cannot do before a presentation is prepared.

Where Will the Data Come From?

For analytical graphics the ability to import data is key. Select an integrated program or one that can accept data from the spreadsheet or data base that you are currently using. However, for presentation graphics, which frequently integrate data residing in different data bases and noncomputer sources, quality and capability generally outweigh data compatibility considerations. Presentation graphics usually incorporate less data and more text than graphics used for analysis. It is usually faster to type in additional text than to search through and import parts of an external data base.

Nonetheless, the ability to import data from frequently used data bases is an important consideration, especially if you plan to use the same program for analysis and presentation. If the program supports the popular .DIF file format, it can be used with a number of programs, including *VisiCalc* and *1-2-3*. Some programs can also read popular mainframe formats such as FORTRAN flat files. In the near future, multiple-window operating environments, which enable powerful stand-alone programs to interact with each other, may be the best solution for developing presentation graphics.

The Demonstration

Once you have answered the basic questions outlined above, you should be able to narrow your choices down to a few graphics packages that suit your needs. At that point nothing substitutes for a hands-on demonstration of the packages you are considering. Some salespeople will want to give you a "canned" demonstration of the system. Also insist that you get a chance to sit down

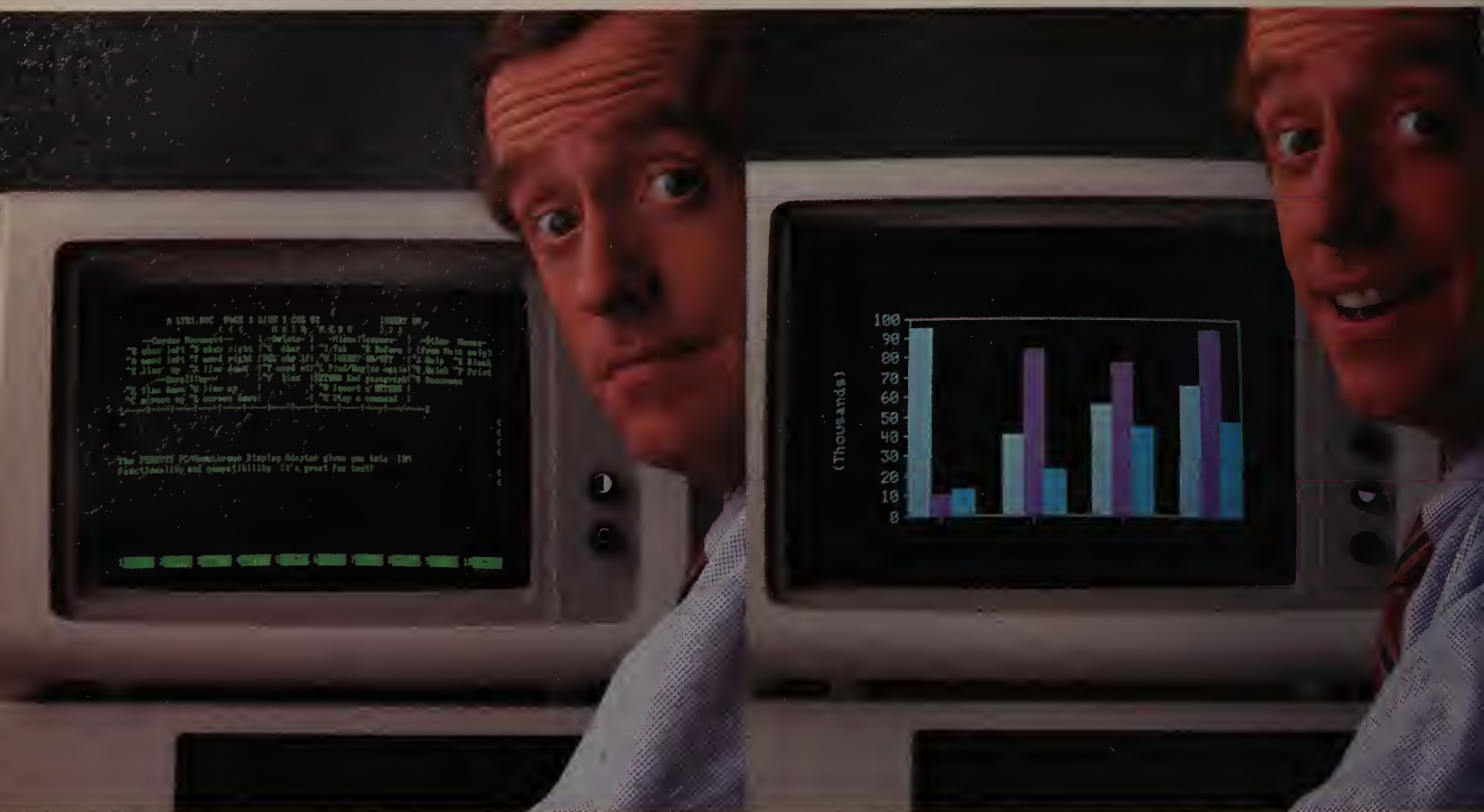
Each chart should include
sufficient information to stand on
its own.

yourself and actually produce a chart. Have samples of some commonly used charts available so you can reproduce them using the system. Critical shortcomings and potential problems that may have been overlooked will quickly surface. Make sure the hardware and software configuration you are testing is comparable to the one you have budgeted for; high-priced hardware can make a difference.

High-quality graphics software and peripherals can show results the first day. By carefully selecting a package that addresses your requirements, you can ensure that when it's time for your 30-minute presentation, your software won't add to the stage fright, but reduce it. ●

David L. Wilcox is vice president of sales at Graphic Communications, Inc., in Waltham, Massachusetts.

"GET THE WIDEST RANGE OF IBM-COMPATIBLE COLOR GRAPHICS AND THE NEW SUPER



"Monochrome?"

Persyst PC/Color Graphics™ and PC/Monochrome™ display adapters. Same great performance and features as IBM. Available now.

Why wait around for delivery of an IBM monochrome or color graphics display adapter?

Persyst PC/Color Graphics™ and PC/Monochrome™ display adapters give you the same features, total compatibility and performance as IBM. Support IBM display monitors. Work with the IBM PC and XT, as well as Columbia, Corona and other IBM compatibles.

**PERSYST PC/
MONOCHROME
DISPLAY ADAPTER**

And they're in stock, *now*. At your Persyst dealer.

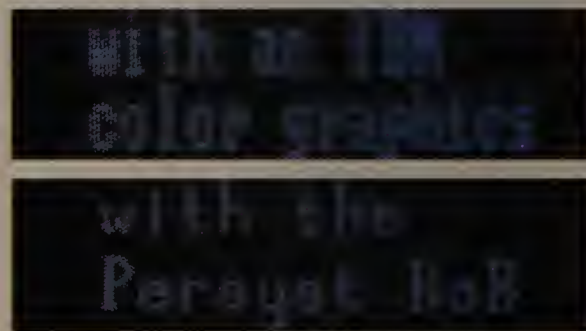
Persyst BoB™ super display adapter. Now you can get the best text resolution ever—in monochrome or color.

You've never seen anything like it. With a high resolution display*, the BoB super display adapter gives you the Best of Both—text and graphics—all on one board.

BoB delivers the clearest, sharpest alphanumeric text mode resolution ever—with a 10 x 16 character cell—in monochrome or color.

**PERSYST PC/
COLOR GRAPHICS
DISPLAY ADAPTER**

"Color graphics?"



BoB gives you the best text resolution ever—even in color.

Brilliant graphics. BoB is unsurpassed.

Want crisp color graphics?

BoB supports IBM-compatible graphics packages like Lotus 1-2-3 with 640 x 200 resolution on both color and monochrome displays.

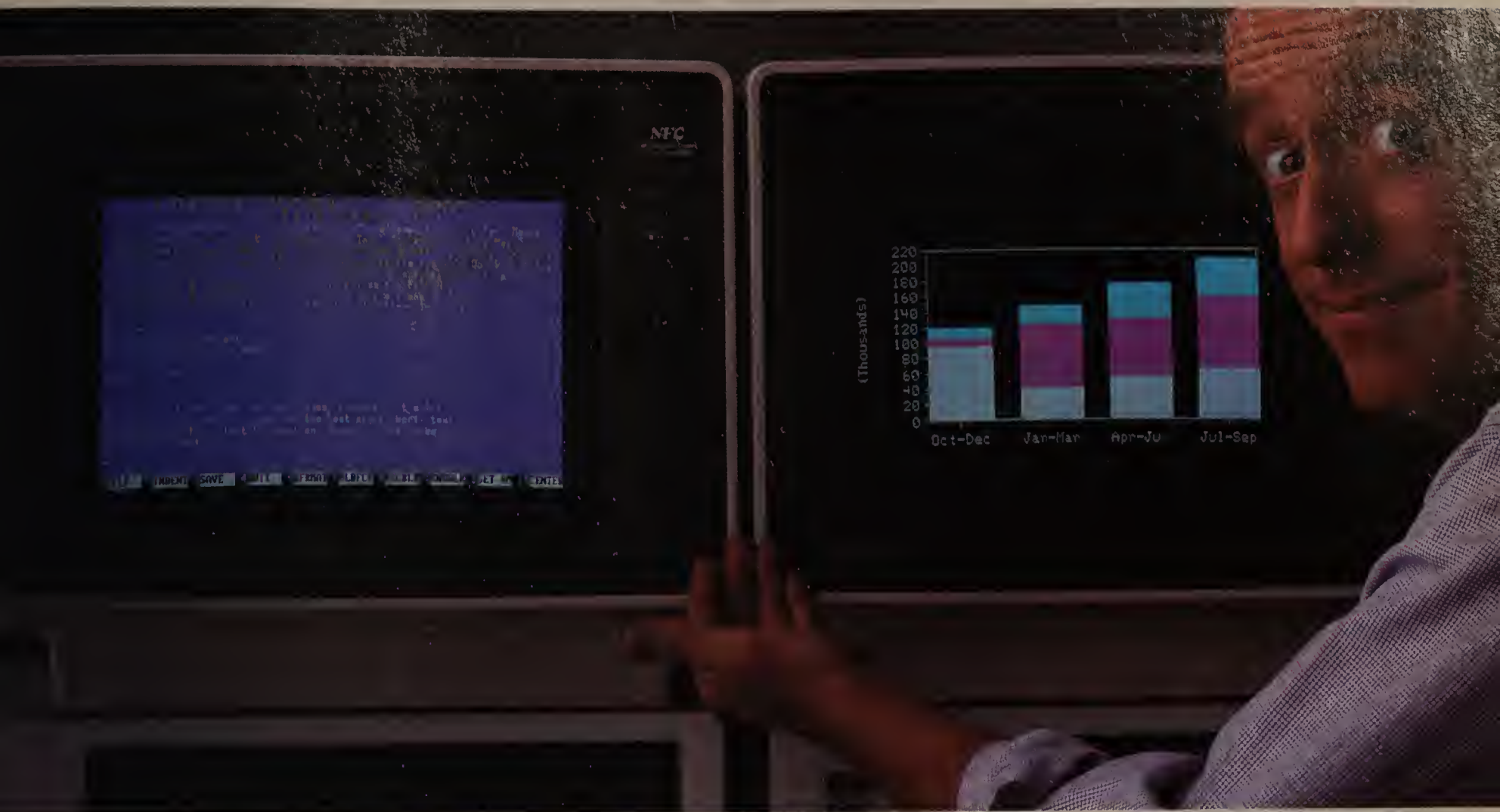
And optional 640 x 400 resolution is available for custom applications.

Custom programmable character sets. BoB gives you flexibility for special applications.

Revolutionary text resolution is just the start of BoB's unprecedented capability.

It is also the only display adapter that lets you use up to three character sets. Two in ROM, and one

ISPLAY ADAPTERS—MONOCHROME, ISPLAY ADAPTER—FROM ONE COMPANY?"



"The best resolution ever—plus color graphics and programmable character sets—all on one board?"

downloadable into static RAM.

Think of it.

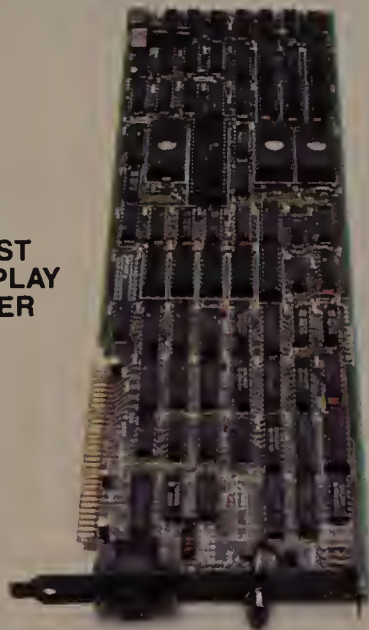
With this unique option, you can design and download up to 256 custom characters. In any combination of language, scientific notation or graphics sets you want.

And you can change character sets as you change applications.

That's powerful flexibility you can only get with BoB.

And only BoB lets you software select between three ROM/RAM character sets. So there's no more struggling with hardware when you want to switch.

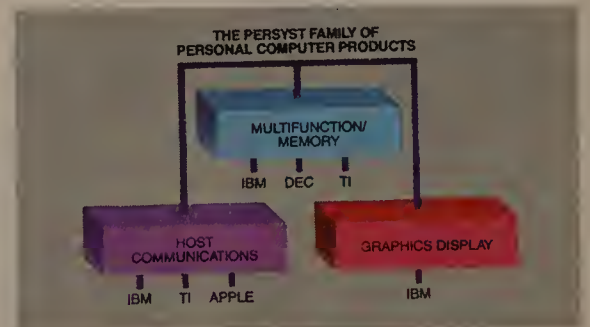
**PERSYST
BoB DISPLAY
ADAPTER**



Foreign languages. APL programming language. Scientific notation. With BoB, you can utilize any combination of character sets.

**Display adapters for the IBM PC.
Insist on Persyst.**

PC/Monochrome and PC/Color Graphics for great basic performance. BoB for enhanced performance. Write or call today for the name of your nearest Persyst dealer or distributor.



PERSYST

Persyst Products, Personal Systems Technology, Inc., 17862 Fitch, Irvine, CA 92714.

Telephone: (714) 660-1010. Telex: 467864.

*NEC JC-1410P2(A), NEC JB-1410P2(A), and other NEC compatible monitors. IBM is a registered trademark of International Business Machines Corp. NEC is a registered trademark of Nippon Electric Corp. 1-2-3 and Lotus are trademarks of Lotus Development Corp.

"YOU CAN WITH PERSYST."

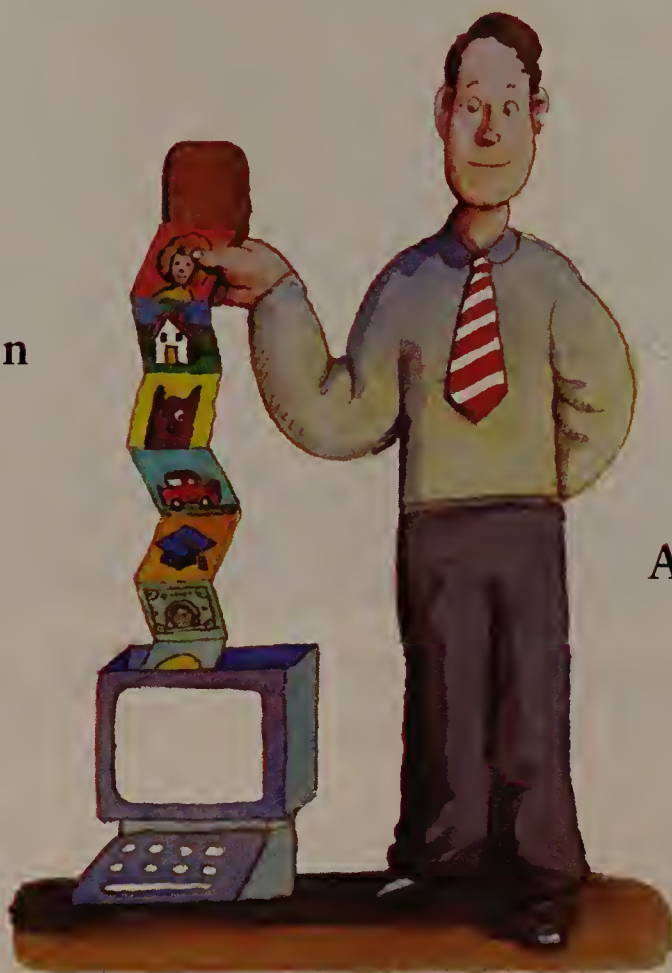
Circle 243 on reader service card

Get More Out of Your PC

Manage Your Information Effectively

Stay Informed and Knowledgeable

Annual Hardware and Software Reviews



PC World shows you how other users are turning their PCs into incredible time-saving tools, using them for spreadsheet analysis, word processing, communications, information management, and much more. You'll learn how people are using PCs to work smarter and to solve all kinds of problems in all kinds of businesses.

Stay Informed and Knowledgeable. At *PC World*, we're PC users ourselves. We constantly review and evaluate the newest in portable PCs, printers, communications interfaces, and software. We tell you what other PC users think, too. So you'll always know what's coming, what to look for, and how to make smart buying decisions.

Annual Hardware and Software Reviews. Compiled by *PC World's* editorial

experts, the annual special issues are the most thorough reference guides available to products for the IBM PC and compatibles. The hardware and software reviews include specs, sources of supply, and price ranges—everything you need to make the buying decisions that are right for you.

PC World is the only magazine that covers it all—consistently, professionally, and thoroughly.

Free Book with Your PC World Subscription. Now available for the first time, *Get More Out of Your PC* contains more than 100 pages of articles, reviews, tips, advice, and how-to help. You'll learn how to use a spreadsheet to maintain your stock portfolio, choose the word processing program that's right for you, keep track of your busi-

ness expenses with a data base, choose a modem, have a computer correct your spelling, and much, much more.

Special Limited-Time Offer. Now for a limited time only you can take advantage of this special introductory offer and save 47% off the newsstand price of *PC World*. You'll get 12 monthly issues and 2 special issues of *PC World* PLUS a free copy of the valuable reference book, *Get More Out of Your PC*. But supplies are limited; you must subscribe before September 30, 1984, to take advantage of this special offer.

Guarantee. If *PC World* doesn't live up to your expectations, cancel your subscription for a full refund on all unmailed issues. No questions asked. The book *Get More Out of Your PC* will still be yours to keep.

PC WORLD

Don't miss your Free copy of

Get More Out of Your PC

Subscribe before September 30!

Save 47% and get this book FREE!

Please enter my subscription for the term checked below and rush my FREE copy of Get More Out of Your PC!

☐ 14 issues/\$24 ☐ 28 issues/\$43 ☐ 42 issues/\$60

☐ Bill me ☐ Payment enclosed

VISA and MasterCard accepted—call TOLL-FREE:
800/247-5470 (in Iowa 800/532-1272).

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD

J129014



Please allow 6-8 weeks for delivery of your first issue. Outside the U.S. subscriptions must be prepaid in U.S. funds. Outside the U.S. and Canada, add \$25 per year for surface mail or \$110 per year for airmail.
Offer expires September 30, 1984

Save 47% and get this book FREE!

Please enter my subscription for the term checked below and rush my FREE copy of Get More Out of Your PC!

☐ 14 issues/\$24 ☐ 28 issues/\$43 ☐ 42 issues/\$60

☐ Bill me ☐ Payment enclosed

VISA and MasterCard accepted—call TOLL-FREE:
800/247-5470 (in Iowa 800/532-1272).

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD

J129014



Please allow 6-8 weeks for delivery of your first issue. Outside the U.S. subscriptions must be prepaid in U.S. funds. Outside the U.S. and Canada, add \$25 per year for surface mail or \$110 per year for airmail.
Offer expires September 30, 1984



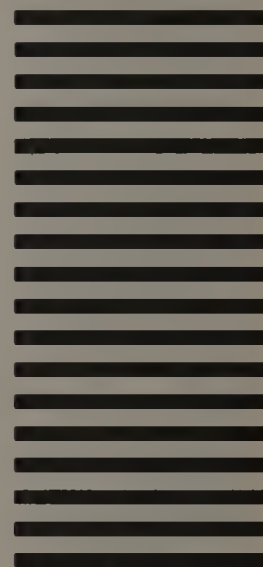
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621



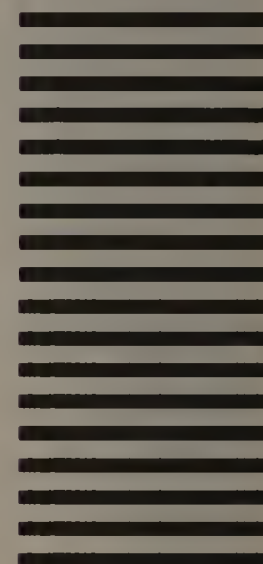
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621



Buy Our
Software....

FREE

TASC MASTER
Profit
Systems, Inc.
©1983 Profit Systems, Inc.
All rights reserved.



And Make One IBM PC™ Worth Nine

TASCMaster™ SOFTWARE does that by converting PC-DOS to CONCURRENT PC-DOS thus enabling you to create up to 9 tasks and run up to 9 programs simultaneously. **TASCMaster™ DOES THE WORK OF NINE.**

While you are working with a task on the screen other tasks are working for you.

To give you every board you may ever need for your IBM PC we include with **TASCMaster™ SOFTWARE** a powerful **MULTIFUNCTION board FREE!**

TAKE YOUR CHOICE OF:

ADDRAM ELITE™ FEATURES or **ADDRAM PLUS™ FEATURES**

- | | |
|--|--|
| • asynchronous (Serial-RS232C) communication adapter | • two asynchronous (Serial-RS232C) communication adapters |
| • real time clock/calendar | • real time clock/calendar |
| • parallel printer adapter | • 64K to 512K memory with parity "no piggyback" and—all on one board |
| • 64K to 512K memory with parity "no piggyback" and—all on one board | • 64K to 512K memory with parity "no piggyback" and—all on one board |
- With 64K memory installed With 64K memory installed

With **RAMDISK™** and **RAMPOOL™** SOFTWARE, TOO.

Optional **MULTI-TASCMaster™ SOFTWARE** enables the addition of **MULTI-USER** capability to the IBM PC by connecting additional terminals to the serial ports, and integrates with **TASCMaster™**

YOU NEED TASCMaster™ SOFTWARE with the *free* multi-function board to make **ONE IBM PC** worth nine.

Available through personal computer dealers. For further information or name of local dealer call:

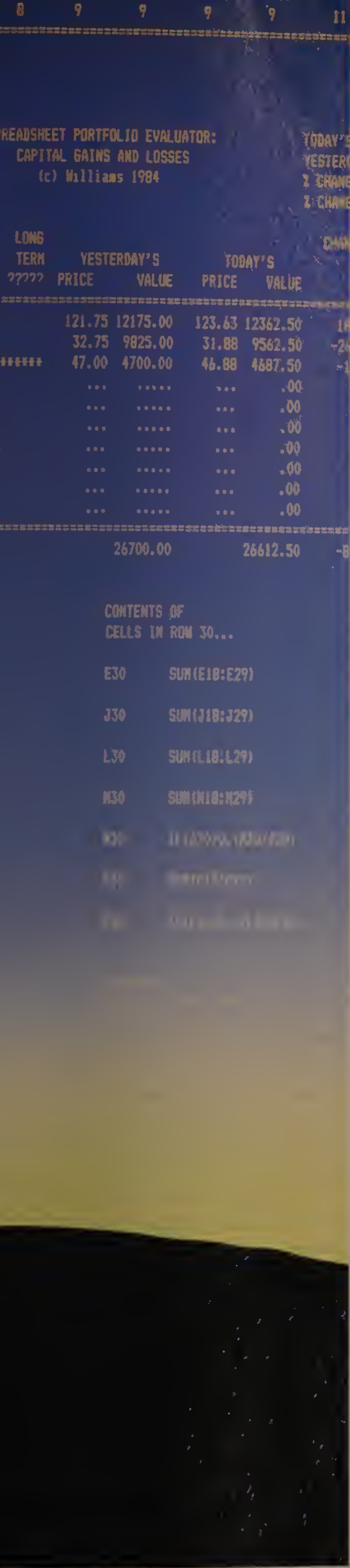
**Profit
Systems, Inc.** 

30150 Telegraph Rd. • Birmingham, MI 48010 • (313) 647-5010

IBM is a trademark of IBM Corporation
(TM) indicates trademark of Profit Systems, Inc.
PC-DOS is a trademark of IBM Corporation
Copyright 1983 Profit Systems, Inc.

Circle 468 on reader service card

A man in a blue shirt and glasses stands with his back to the camera, looking out over a vast, flat landscape under a clear sky. He has his hand on his hip and is holding a small object near his face.



● Getting Started: Spreadsheets

Introduction to Spreadsheets

An electronic spreadsheet can transform your fanciful financial speculations into the numbers you need to plot the future course of your business.

Harry Miller

As its name suggests, an electronic spreadsheet is simply the computerized equivalent of an accountant's worksheet. Like its paper counterpart, an electronic spreadsheet is a grid of columns and rows that enables you to organize information in a standardized, readily understandable format.

Spreadsheets can be used to perform almost any task that previously had been done with pencil and calculator. Spreadsheets are commonly used for preparing budgets, evaluating proposals, comparing alternatives, and measuring results. To these tasks the spreadsheet brings increased efficiency and productivity. Compared to pencil and calculator, the spreadsheet is faster, more flexible, and less error prone. Once you begin using a spreadsheet to make calculations you will find yourself considering more options and forecasting further into the future because the spreadsheet has eliminated much of the tedium, leaving you free for creative decision making.

Spreadsheet Grammar

The intersection of a vertical column and a horizontal row in a spreadsheet creates a "cell." A cell can contain either a label (text) or a value (a number or a formula).

Formulas create relationships between values in specified cells. For example, you might want to add a column of numbers in cells B2, B3, and B4 and have the result appear in cell B6 (see Figure 1). To do that, cell B6 would contain a formula that depended on the values in the other cells. The formula might look like '+ B2 + B3 + B4' or '@SUM (B2..B4)'. Going a step further, you might want to add several column totals across the spreadsheet, say to determine the annual total of the quarterly expense columns. The formula (in cell G6, G being the 7th column) that calculated the annual total would depend on the value of the cells to the left of it (cells B6 to F6). Formulas can be much more complex than simple sums; they can contain high-level financial calculations such as internal rate of return or intricate mathematical expressions such as logarithms or trigonometric functions.

The underlying concept of formulas is that they determine the value in one cell depending on values in other cells. Once you master this basic concept, spreadsheets are relatively easy to use. What's important is learning to rethink and express

● Getting Started

	A	B	C	D	E	F
1		Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec	Annual
2	Food	1200	1320	1452	1597	5569
3	Rent	2100	2100	2100	2100	8400
4	Utilities	450	495	545	599	2088
5		-----	-----	-----	-----	-----
6		3750	3915	4097	4296	16058
7						
8						

Figure 1: Simple spreadsheet relationships. Cells in row 6 show the sums of the rows above them, and cells in column F add the values of the cells to their left and display annual totals.

business relationships in terms of values. For example, profit = income - expenses, or administrative expense = 15 percent of revenue. Once you have defined those relationships, you can analyze almost any situation that can be represented by numbers.

One of the reasons for the electronic spreadsheet's popularity is that it presents and works with data in a tabular format similar to that most managers encounter in their daily work. But the true magic of the spreadsheet lies in its ability to project and evaluate alternatives—the proverbial “what if” analyses. The principle of interrelated cells makes it easy to immediately see the effects of changing assumptions. When you type in a new value and press <Enter>, the change ripples through the model as the values of all the dependent cells are recalculated.

Common Features

Although programs vary, most electronic spreadsheets share a basic set of features. These features are implemented either by spreadsheet commands that usually affect large blocks of cells or by formulas that are tied to individual cells.

The following is a list of some of the most common spreadsheet commands.

Copy enables you to copy the contents of a cell (label, value, or formula) or group of cells into another cell or group. Most programs automatically adjust copied formulas to reflect their new locations; that is, the relationships in the formula stay the same—only the locations change.

Delete removes the column or row at the current cursor position and makes the necessary adjustments to subsequent cell addresses.

Format controls the way in which individual cells, columns, rows, or blocks are displayed. You can usually specify the width of a column, the number of decimal places displayed, whether the text or numbers in a column will be right- or left-justified or centered, whether thousands will be separated by commas, and whether negative numbers will be preceded by minus signs or surrounded by parentheses.

Insert adds a row or column anywhere in the spreadsheet and automatically adjusts the cell addresses of all the cells that were moved.

Load or *File Retrieve* fills the screen with a spreadsheet file that has been stored on a disk.

Move takes the contents of a cell or group of cells to a cell or group at a different location in the spreadsheet. Unlike Copy, Move does not leave a copy of the contents behind in the original cell or cells.

Print provides various methods for getting part or all of the spreadsheet onto paper.

Save places the current spreadsheet into a disk file.

Titles protects a row or column so that it is displayed at the top or the left edge of the screen regardless of how the rest of the spreadsheet might be scrolling by.

Window splits the screen either horizontally or vertically so that distant portions of a worksheet can be viewed side by side.

A function common to most spreadsheets is @SUM, which is used to add a column or row of numbers. Most spreadsheet programs also include some higher mathematical functions, such as average, absolute value, square root, sine, tangent, cotangent, logarithm, and exponentiation. The @LOOKUP function finds values from a previously entered table—a very useful feature for tax calculations, for example. Financial functions such as internal rate of return and net present value are also common.

Advanced Features

As more and more spreadsheet packages are adapted to take advantage of the IBM PC's unique capabilities, many advanced features are becoming standard. Some software com-

Code	Date		Amount	DATA TABLE FOR SUBTOTALS BY CATEGORY AND MONTH				
	Mo	Da		Code		Mo		
DEPT 2	1	12	1000	51000 Mo	DEPT 1	DEPT 2	DEPT 3	
DEPT 2	1	22	5500		1	0	6500	1000
DEPT 3	1	25	1000		2	3000	4000	0
DEPT 1	2	3	3000		3	1000	0	5500
DEPT 2	2	15	4000		4	4000	0	7000
DEPT 1	3	18	1000		5	5500	4000	0
DEPT 3	3	23	5500	6	6	0	8500	1000
DEPT 3	4	16	3000					
DEPT 3	4	19	4000					
DEPT 1	4	22	3000					
DEPT 1	4	25	1000					
DEPT 1	5	4	5500					
DEPT 2	5	17	4000					
DEPT 3	6	1	1000					
DEPT 2	6	25	3000					
DEPT 2	6	27	5500					

Figure 2: A 1-2-3 data table. The table calculates sums for each combination of variables (month and code).

panies sell one program or a closely related group of programs that perform a variety of applications, such as spreadsheet, data management, word processing, business graphics, telecommunications, calendar, and project management. These packages, referred to as "integrated" products, allow you to follow your natural thought processes. For example, a data management problem or a spreadsheet question may come up while you are in the middle of a word processing file. With an integrated product you don't have to exit one program, remove the disk, put a different application in, and start it up. You merely place the first program on "hold," pull the other program up on the screen, do your work, and then return to the first program. This integrated approach makes exchanging data among various applications easy.

Several software companies now offer products that integrate applications at the operating system level. That means that you can use individual applications programs from

different software vendors and still have the convenience of moving easily from one application to the next as well as the ability to transfer data among applications. VisiCorp's *Visi On*, Microsoft Windows, and Quarterdeck's *DesQ* are examples of integrated products.

Some spreadsheets allow a user to redefine the meanings of certain keystroke combinations. Labels, formulas, and commands that would normally require many keystrokes can be stored as one- or two-key commands. These redefinitions, called "macros," can be quite complex and can include long strings of commands with text or cell references embedded in them.

As you might imagine, keyboard macros can save significant amounts of time. A keyboard macro may be used in place of a very short but awkward cursor movement that is commonly used. If you have to enter data in the first and fifth column of each row, a simple cursor-movement macro (e.g., {down}{left}{left}{left}{left} in 1-2-3 by Lotus Development Corporation) can be very helpful and satisfying.

In addition, key redefinition (via either the internal capabilities of the program or a separate keyboard macro program such as *ProKey*) can free up keys that have several functions. For example, the cursor-movement function of the arrow keys on the numeric keypad could be moved to another part of the keyboard, freeing the numeric keypad for quicker data entry.

To date, 1-2-3 is the only program that has an automated data table feature. This impressive function lets you define a matrix of possible combinations of variables to be used in a model. The data table function runs through the spreadsheet model using each combination of variables in turn and reporting the result in the matrix. (See Figure 2.)

Comparison Shopping

Although most spreadsheet programs perform the same functions, programs differ significantly in style and capability. Almost any of the spread-

A Spreadsheet Sampler

There are nearly 50 spreadsheet packages on the market; the following is a list of the most notable among them. Some of these packages, such as *VisiCalc*, are solitary travelers in the world of software and perform only the spreadsheet function. Others, such as *1-2-3*, are integrated and may include data base, graphics, word processing, and communications programs on the same disk or work with a family of packages providing these services.

MicroPlan
Chang Laboratories, Inc.
5300 Stevens Creek Blvd. #200
San Jose, CA 95129
408/246-8020
List price: \$495

MBA
Context Management Systems
23868 Hawthorne Blvd.
Torrance, CA 90505
213/378-8277
List price: \$695

1-2-3
Lotus Development Corp.
161 First St.
Cambridge, MA 02142
617/492-7171
List price: \$495

PlanStar
CalcStar
MicroPro International
Corporation
33 San Pablo Ave.
San Rafael, CA 94903
415/499-1200
List price: PlanStar \$695,
CalcStar \$195

Multiplan
Microsoft
10700 Northup Way
Bellevue, WA 98004
206/828-8080
List price: \$275

Perfect Calc
Perfect Software
1400 Shattuck Ave.
Berkeley, CA 94709
800/222-4222
List price: \$295

SuperCalc3
Sorcim Corporation
2310 Lundy Ave.
San Jose, CA 95131
408/942-1727
List price: \$395

VisiCalc IV
VisiCorp
2895 Zanker Rd.
San Jose, CA 95134
408/946-9000
List price: \$250

sheet programs listed in "A Spreadsheet Sampler" will perform simple budgeting and projection tasks. But some approach these tasks in a way that most closely matches the way you like to work. You should consider how each of the programs you look at handles the following features.

Command structure and menu style. Although most spreadsheets use the same basic commands, the method of issuing those commands can vary greatly. *VisiCalc* and *SuperCalc* display a prompt line of initials at the top or bottom of the screen that represents possible command choices; *1-2-3* uses a menu of full-word commands supplemented by a one-line description of what the currently selected command does or what choices are available at the next level. For flexibility, *1-2-3* also lets you issue commands by typing their initials.

On-line help. At its best, on-line help means that by pressing a key you can have access to one or more screens that explain the function being used and describe what you can do next. This type of context-sensitive help screen can save time that would have been spent flipping through a user manual. At the other end of the spectrum, a call for on-line help displays a skimpy description with little (if any) information about which commands might be currently appropriate.

Data capacity per cell. When long labels are necessary, an application requires especially long formulas, or a data field must be longer than most spreadsheet data, the limitation on the number of characters that will fit in a single cell can make a difference. Maximum cell capacities range from as few as 80 to as many as 8000 characters. Capacity is different, by the way, from maximum column width. Some spreadsheets let you store more characters in a cell than are displayed.

Bi-Graphix™ does more... and here's the proof!



Bi-Graphix™

Bi-Graphix I replaces both the IBM Monochrome Display/Printer Adapter and the Color/Graphics Adapter Card. It will also allow graphics to be displayed on the IBM Monochrome Monitor.

No modification is needed to run standard graphics software on the IBM Monochrome Display.

Monitor and mode selection is done easily by the flip of a single external switch. With two 9 pin output connectors you can have the IBM Monochrome Display and a color monitor connected simultaneously. Switching between the two monitors can be performed through software.

With **Bi-Graphix I** you can run Lotus 1-2-3 with the IBM Monochrome display, and enjoy the benefits of superior text quality and graphics without sacrificing compatibility.

Bi-Graphix II is a piggyback card with 128 k of memory. By installing Bi-Graphix II onto Bi-Graphix I you will be able to reach resolutions of 640 x 400 in 16 colors, using any standard high resolution color monitor. Resolutions of 720 x 700 can be attained on the IBM Monochrome Display.

PC+ and Colorpius are trademarks of Frederick Electronics.

Hercules is a trademark of Hercules Computer Technology.

Graphics Master™ is a trademark of Techmar, Inc.

STB is a trademark of STB Systems Incorporated.

IBM is a registered trademark of International Business Machines. 1-2-3 is a trademark of Lotus development Corp.

PGS is a trademark of Princeton Graphics System. Bi-Graphix I and Bi-Graphix II are trademarks of PC components.

	PC Components— Bi-Graphix	IBM—Monochrome/ Printer Adapter	IBM—Color Graphics Adapter	Hercules Computer Tech- nology—Graphics Card	Techmar— Graphics Master	Paradise Systems— Multidisplay Board	STB—Graphix Card	PC+ Products Colorpius
100% compatible with the IBM Monochrome Adapter Board, IBM's highest quality text mode	YES	YES			YES	YES	YES	
100% compatible with the IBM Color Graphics—for RGB and composite video monitors, lightpen	YES		YES		YES	YES		
Operate standard IBM Color Graphics software on the IBM Monochrome Display—(Lotus Graphics, etc.)	YES						YES	
Connect two monitors simultaneously and switch either by software or an external switch	YES					YES		
Graphics resolutions on the IBM Monochrome Display of 720 x 700, includes advanced software support	YES			YES				
Graphics resolution on an RGB Monitor of 640 x 400 with 16 colors, includes advanced software support	YES				YES			
Requires device drivers to operate Lotus 1-2-3 Graphics on an IBM Monochrome Display	NO			YES	YES		NO	
Includes a standard IBM Parallel Printer Port	YES	YES		YES		YES	YES	YES
Operate with a standard television set	YES		YES		YES	YES		

PC Components, Inc.

1916 Welsh Road, #6, Philadelphia, PA 19115
Telephone: 215-934-6990

Circle 107 on reader service card

Dealer Inquiries Invited

A Few Spreadsheet Tips

Create a separate data input area to hold assumptions, opening balances, base figures, and other data. The best place for the input area is the upper left corner of the worksheet. The body of the worksheet should contain only formulas and references to data input area cells. That way you can easily see what assumptions results are based on.

Establish separate areas in the spreadsheet for data input, criteria (for sorts or searches), and output (results) and then an area to store all keyboard macros. The data management input area stores all the data that will be searched, sorted, or extracted and might actually be the worksheet body of data.

Use templates. Setting up a basic model of a spreadsheet and saving a copy of the model with no data (a template) will allow

you to use that model again and again without wasting time re-creating it. Just load the file holding the template you've created, key in the data, and save the resulting worksheet under a unique name. Leave room at the top of the template for the date and notes about what data it contains.

Once you become proficient with templates, you might consider writing keyboard macros that build the templates "on the fly." Such macros take up less memory and disk storage space than templates but may load a little slower. (See "/X Marks the Macro," *PCW*, Vol. 2, No. 3, for an example of this technique.)

Include cross-checks. A prudent spreadsheet model should calculate important values more than one way to cross-check the results. Have an @IF statement

signal when a cross-check discrepancy is found. For example, in Figure A the annual total in cell F6 could also be calculated as the sum of cells F2 to F4. As a cross-check, you could type the formula @SUM(F2..F4) in cell F10. Then in cell F15, type @IF(F10<>F6,1111111,0. That will display a 0 if the sum in F10 matches the number in F6 and will display a row of 1's if there is a discrepancy.

Experiment. It's easy to change values and watch the results. Do it often and you will get a better feel for spreadsheet software. Substitute some wildly optimistic or pessimistic values for your assumptions. You may gain insight into the way your model works that wouldn't come out under normal circumstances.

	A	B	C	D	E	F	G
1		Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec	Annual	Cross-check
2	Food	1200	1320	1452	1597	5569	
3	Rent	2100	2100	2100	2100	8400	
4	Utilities	450	495	545	599	2088	
5		-----	-----	-----	-----	-----	
6		3750	3915	4097	4296	16058	16058
7							0
8							

Figure A: The formula in cell F6 calculates the annual total as the sum of cells B6 to E6. The formula in cell G6 calculates the same value, but as

the sum of column F. The formula in cell G7 says: if cell G6 is not equal to cell F6, display a row of 1's; otherwise, display a zero.

Maximum spreadsheet size. Perhaps more important than cell capacity is the spreadsheet's maximum size, as measured by the number of columns and rows it can contain. Typical spreadsheet applications use small areas, but when you need a few more cells, you need a few more cells. *VisiCalc*, *SuperCalc*, and *Multiplan* spreadsheets allow 63 columns and 254 rows. *1-2-3* worksheets can contain 256 columns and 2048 rows.

Absolute size specifications can be misleading, however. Values, labels, and formulas take up different amounts of memory. To fill every cell in a *1-2-3* worksheet, you'd have to use only values (no formulas) and have a computer loaded to the brim with RAM (random access memory—the computer's main memory, consisting of chips in the system unit). Programs also differ in the way they store blank cells. For example, *1-2-3* reserves enough memory to hold a spreadsheet whose size is defined by the cells furthest down and to the right that contain data, and continues to reserve that amount of memory even after that data is erased. That means that you might need much more memory with *1-2-3* than with some other programs to fill a similarly sized worksheet.

Merging worksheets. Microsoft's *Multiplan* takes a different approach to spreadsheet size than *1-2-3*. Although *Multiplan* can use only 64K of user memory (RAM), the ability it provides to link worksheets means you can create "virtual" (or "conceptual") worksheets of almost unlimited size. When a large spreadsheet must be split into smaller sheets, those sheets are either dependent or supporting. The supporting sheets hold data that is used by the dependent sheets. If a value designated for such a connection is changed on the supporting worksheet, the related values on the dependent worksheet are automatically

Save space, improve ergonomics and system life.



The SS-I System Stand by Curtis offers you more freedom of arrangement. Reduces the systems unit footprint by 54%. Use less desktop space, or no desktop space at all – put it on the floor! It feels great. Also, with less disk drive wear in the vertical position, systems unit can be expected to have a longer life and less down time with the SS-I.

Get the sturdy SS-I and stand your systems unit on its ear – it feels great and lasts longer.

Re-arrange your IBM PC ... comfortably

Developed exclusively for the IBM PC, all Curtis products have a lifetime warranty and are a perfect PC match in color, style and finish.

PC Pedestal™ II, Tilt and Swivel Base . 79.95
(for IBM PC Monochrome and Color Displays)
AD-I Adapter for PC Pedestal™ 9.95
(for Princeton Graphics Systems and Quadchrome Displays)
SS-I System Stand 24.95
(for IBM PC System Unit)

EC-I 3' Extension Cable Set 49.95
(for IBM PC Monochrome Display)
EC-II 3' to 9' Extension Cable 39.95
(for IBM PC Keyboard)

Manufacturing Company, Inc.

CURTIS

Curtis Manufacturing Company, Inc.
Peterborough, NH 03458

**Available at all
ComputerLand Stores
Entre Computer Centers
ComputerMarts
ComputerCrafts
Micro Age
or your local
PC dealer.
Over 800 locations nationally.**

For the dealer nearest you
call (603) 924-7803.

A104



Computer Woodware by New England Wood Designs,
Dublin, New Hampshire 03444

Copyright © Curtis Manufacturing Co., Inc.

reduce footprint

● Getting Started

updated the next time the dependent sheet is used. This is a slightly tricky but powerful technique, since smaller worksheets are invariably easier for a spreadsheet user to handle than larger ones.

Naming cells and ranges. Some spreadsheet programs let you assign a name to a cell or a range (block) of cells. This feature adds convenience and flexibility. Referring to a range of cells called "Prices" is easier than remembering that the prices are in cells A1 through A15. More importantly, if a formula refers to the range called "Prices," it will still find those prices if the range containing them is moved to another part of the spreadsheet. If you failed to name the range or had a program that lacked this feature, when you moved the range you would have to go back and change all the formulas that refer to that range to reflect the new location.

Speed of calculation. A spreadsheet's calculation speed depends on several factors. Does the program do all of its work in memory, or must it frequently access the disk? (The mechanical disk drive is much slower than the purely electronic process of manipulating data in memory.) What language is the program written in? (Assembly language is faster than C, which is faster than Pascal or BASIC, which are faster than the p-System.) What mathematical methods and algorithms are used? What degree of accuracy is attained?

Testing the relative speed of spreadsheet programs usually requires using a reasonably large model. Such a model can be built by copying a few formulas over a large area of the worksheet.

Automatic and manual calculation. Most spreadsheet programs automatically recalculate an entire spreadsheet each time any value is changed. As a worksheet gets larger, the time wasted watching the program redraw the screen becomes more and more significant. Some programs allow you to set the calculation mode to manual so that the worksheet is not recalculated until you give the command.

Forward and circular references. Most spreadsheet programs recalculate row by row; that is, they calculate the formulas in row 1, then they go to row 2, and so on. Some programs let you change the order of recalculation so that it works column by column. Either way, there's a potential problem: if a formula depends on a value that is recalculated after the formula is calculated, you may get an error known as a forward reference—a cell formula that refers to a value not yet calculated.

Suppose you have a simple *VisiCalc* or *SuperCalc* worksheet with three filled cells (see Figure 3). In cell A1 you enter the value 10; in cell B1 you type the formula $C3*10$ (the value in C3 times 10); and in cell C3 you use the formula $A1*2$ (the value in A1 times 2). When you start out, $A1 = 10$, $B1 = 200$, and $C3 = 20$. If the value of A1 were changed to 1, you can see the problem. With sequential, column-by-column recalculation, B1 would still be 200. This value remains the same, even though C3, the cell it depends on, has changed value from 20 to 2, because C3 was recalculated later.

Some sophisticated spreadsheet programs such as 1-2-3 avoid the forward reference problem by using a "natural order" of recalculation. A formula is not recalculated by 1-2-3 until the program has calculated all of the formulas on which it depends. If 1-2-3 finds a forward reference, it goes forward and calculates the forward formula.

No spreadsheet, however, can deal with the circular reference, in which one cell's formula depends on a second cell, whose formula depends on the value of the first cell. Circular references get you nowhere fast.

Data entry forms. One of the nice things about spreadsheets is that they display data in a tabular fashion that makes it easy to use. But entering data into such a format (particularly with a large spreadsheet) has all the efficiency of hunt-and-peck typing.

Some spreadsheets (*Context MBA* is the most impressive example) have forms modes whereby you can enter data on a screen form that you design. The data is then automatically copied into a spreadsheet's tabular format. Some other spreadsheets have the potential, if not the built-in capability, to accomplish this with macros.

Flexible cursor control likewise makes data entry much easier. A spreadsheet program should make good use of the PC's keyboard, including the <Home>, <End>, <PgUp>, <PgDn>, and function keys.

A spreadsheet is a handy tool, but it is not a decision maker. A spreadsheet assembles and organizes all the data and facts about a decision or a plan and then performs calculations that indicate the consequences—for example, profit or loss or cash flow. Remember—you control the assumptions and therefore the results. ●

Harry Miller is the Editor of PC World.

A1: 10									READY
	A	B	C	D	E	F	G	H	
1	10	C3*10							
2									
3			A1*2						
4									
5									
6									
7									
8									
(A)									
A1: 10									READY
	A	B	C	D	E	F	G	H	
1	10	200							
2									
3			20						
4									
5									
6									
7									
8									
(B)									
A1: 1									LABEL
*									
	A	B	C	D	E	F	G	H	
1	1	200							
2									
3			2						
4									
5									
6									
7									
8									
(C)									
A1: 1									READY
	A	B	C	D	E	F	G	H	
1	1	20							
2									
3			2						
4									
5									
6									
7									
8									
(D)									

Figure 3: Forward references. Formulas entered in three cells (A) result in simple calculated values (B). When the value of cell A1 is changed to 1, cell B1 doesn't change if the spreadsheet is simply calculated column by column or row by row (C). However, 1-2-3's natural calculation presents the correct results (D).

TO GET AHEAD IN BUSINESS,



INTRODUCING AURA. THE MOST ADAPTABLE SOFTWARE YOU CAN BUY.

To become successful, you have to work in your own special way. Unfortunately, most software works in ways that aren't the same as yours. And that can make your climb to success much tougher.

But Aura is the software that works the way you do. In fact, Aura adapts easily to your type of business. And to your individual way of doing business.

This flexibility results from the special capabilities of a database that integrates with 3-D spreadsheets, business and free-form graphics, plus word processing. And Aura's totally menu-driven design makes it all easy to use.

APPLICATIONS THAT APPLY TO YOU.

With Aura, you can create your own menus and define entire sets of tasks. This



unique capability means you can make Aura operate exactly the way your business does at the touch of a key.

IT INTEGRATES WITH THE WAY YOU WORK.

Aura's integration lets you instantly tie one function to another. For ex-

ample, while you're using the word processor, you can pull information from your records, spreadsheets or graphics to include in the report you're working on. You'll



1. Information Management
2. Electronic Spreadsheets
3. Business Graphics
4. Word Processing

YOU NEED THE AURA OF SUCCESS.



never enter information twice.

AURA WON'T GROW OLD.

Aura keeps adapting and growing with you, too. When you change file data in the Information Manager, Aura's other functions are automatically updated so you're always working with current data. And if you change the structure of a file, all the records

in that file change as well.

AURA ADAPTS TO YOU.

Simply put, Aura is the software that can mirror the way you do business. Not just approximate it. So if you want to get the most out of an IBM or similar personal computer, get the software that will fit you personally. You'll work faster and easier

than ever before. And that can give you the Aura of success.

To find out more ask your local computer dealer, or contact: Softrend, Inc., 2 Manor Parkway, Salem, NH 03079, (603) 898-1896.

AURATM
The most adaptable software you can buy.

DATAPRODUCTS INTRODUCES PAPER



We're Dataproducts, the largest independent printer manufacturer in the business. We supply printers to the top computer companies in the world.

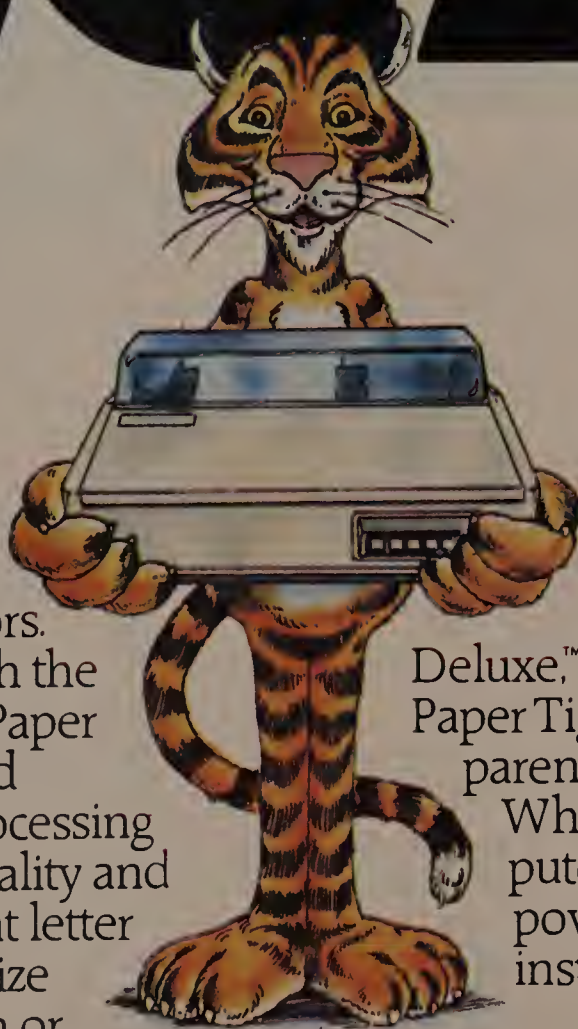
And we're showing the world a new breed of computer printer, Paper Tiger.[®] It's fast. It's tough. And it's smart.

Our black and white computer printer is a real animal. The black and white Paper Tiger is a roaring success. It

prints crisp, sharp letter quality text, graphs and charts in bold, high contrast black and white. And it fills a full page in a matter of seconds.

You'll love the color of our stripes. The color Paper Tiger uses a high performance color ribbon to print anything you want in any color you want. Or it can print alternate lines of copy in different colors for needed emphasis. Facts are more easily understood when graphs,

TIGER[®]



charts and text are printed in Paper Tiger's vibrant colors.

A tale of two tigers. Both the black and white and color Paper Tiger have three print speed modes: high speed data processing quality, correspondence quality and they really strut their stuff at letter quality speed. They minimize loading problems, use plain or pin feed paper and plug in easily to work with all popular personal computer hard-

ware and software on the market like Volkswriter Deluxe,[™] Lotus,[®] Apple[®] and IBM.[®] Paper Tiger even prints on transparencies for overhead projections. When you're hunting for a computer printer remember the powerful animal with the write instincts, Paper Tiger.

For more information, go to your nearest computer store, or call Dataproducts at 603-673-9100.



Dataproducts Paper Tiger. The most powerful name in computer printers.

Nobody puts ideas on paper so many ways. Dataproducts Corporation, Route 13 South, Milford, NH 03055.

IBM is a registered trademark of International Business Machines Corporation. Volkswriter Deluxe is a registered trademark of LIFETREE SOFTWARE, INC. Lotus is a registered trademark of Lotus Development Corporation. Apple is a registered trademark of Apple Computer, Inc.

**NEW INSIDER
SUB SYSTEMS**

\$895.⁰⁰

#IS18 SHOWN

- IS00**
- 10 Mega-Byte Winchester
 - Hard Disk Controller

UPGRADES FOR YOUR IBM® PC /PC COMPATIBLES

- | | | |
|-------------|-------------------------------------|------------------|
| IS01 | • 10 Mega-byte Winchester | |
| | • Modular hard disk controller | |
| | | \$1095.00 |
| IS02 | • 10 Mega-byte Winchester | |
| | • Floppy/Hard disk controller | |
| | | \$1295.00 |
| IS16 | • Half-high tape drive | |
| | • XT-Power Supply | |
| | | \$ 995.00 |
| IS17 | • Half-high tape drive | |
| | • Half-high floppy drive | |
| | • XT-Power Supply | |
| | | \$1265.00 |
| IS18 | • Half-high tape drive | |
| | • Half-high 10 Mega-byte Winchester | |
| | • Hard disk controller | |
| | • XT-Power Supply | |
| | | \$2095.00 |
| IS20 | • 20 Mega-byte Winchester | |
| | • Hard disk controller | |
| | | \$1595.00 |
| IS21 | • Half-high tape drive | |
| | • Half-high 20 Mega-byte Winchester | |
| | • Hard disk controller | |
| | • XT-Power Supply | |
| | | \$2495.00 |
| IS40 | • 40 Mega-byte Winchester | |
| | • Hard disk controller | |
| | • XT-Power supply | |
| | | \$2895.00 |

- | | | |
|-------------|---------------------------|------------------|
| IS41 | • Half-high tape drive | |
| | • Half-high floppy drive | |
| | • 40 Mega-byte Winchester | |
| | • Hard disk controller | |
| | • XT-Power Supply | |
| | | \$3795.00 |
| ISPS | • XT-Power Supply | |
| | | \$ 290.00 |

TAPE FOR YOUR IBM® XT

- | | | |
|-------------|--------------------------|------------------|
| XT01 | • Half-high tape drive | |
| | • Half-high floppy drive | |
| | | \$ 995.00 |

Micro Design International Inc. has been serving the computer industry for over 7½ years, call us today for our complete catalog or to place your order.

TO ORDER CALL COLLECT
(305) 677-8333

Master Card/Visa/Check/or Money Order

**MICRO DESIGN
INTERNATIONAL INC.**

"Your internal solution"

6586 University Blvd. Suite 7
Winter Park, Florida 32792

IBM is a registered trademark
of International Business Machines Corporation

The Help Screen

PC World offers answers and advice at every level.

Karl Koessel

This month we find out why a disk that's only half full will not accept more files—and what can be done about it—by looking at how a disk stores directory entries. Our second item discusses how to search the extended directory path that is defined by the PATH command. It also offers a suggestion for facilitating the use of 1-2-3 with DOS 2.00's tree-structured directory system. Last, we have hardware questions about the IBM's serial board and the XT's hard disk.

Disk Directories

Q. I recently encountered a problem while working on my IBM PC with PeachText, Peachtree's word processor. I found that I was unable to place more than 112 documents or other files (counting the two hidden system files) on a double-sided floppy disk, yet nearly half of the disk space was still available. However, the problem is not with the Peachtree software. DOS 1.10 utilizes a set amount of disk space (3584 bytes on a double-sided disk) for the disk's file directory. Each entry in the directory takes up 32 bytes to record such things as a file's name, size, and location on the disk. Thus there is room for only 112 entries. I'm wondering if you know if there is any way the number of files in the directory can be increased.

*Edward F. Cowman
Freeport, Illinois*

A. The maximum number of directory entries is set when the disk is initialized by the FORMAT command. When a disk is formatted, this number and other information about the disk is stored in the first portion, or sector, of the disk. This number determines how many of the next sectors on the disk FORMAT reserves

There is a way to put more files on your disks by using the tree-structured directories of DOS 2.00.

for the directory entries. In fact, the maximum number of directory entries for a single-sided disk is 64; the number of entries for a hard disk is based on the size of the DOS partition. Although the number of entries allowed can be changed, doing so is complicated and best left to those who design operating systems and device drivers.

However, there is a way to put more files on your disks using the tree-structured directories of DOS 2.00. The FORMAT command of DOS 2.00 creates a disk's directory in the same manner as does DOS 1.10, limiting the directory to 112 entries on a double-sided disk. But in DOS 2.00 you can create and name subdirectories—files that act as separate, additional directories.

To add the subdirectories, format a new disk in drive B: using DOS 2.00. Then create a subdirectory called PEACHTXT with the command MKDIR B:\PEACHTXT. (You can also use the abbreviated command MD B:\PEACHTXT. Both MD and MKDIR mean "make directory.") The subdirectory you make is actually a file, and its name and other directory information become an entry in the initial, limited directory, or root directory. Type DIR B: <Enter> to list the files in the current directory of the disk in the B: drive; the file name PEACHTXT will be followed by <DIR> to indicate that this file is a subdirectory. Next change the current directory of this disk from the root directory to the PEACHTXT subdirectory with the command CHDIR B:\PEACHTXT (or CD B:\PEACHTXT).

Now you can use *PeachText* from drive A: and save your documents to drive B:. The documents you save to drive B: will automatically be stored in the PEACHTXT subdirectory, and since the subdirectory is a file and not a limited set of sectors like the root directory, its size is not limited, and it will store as many files (directory entries) as you can fit on the disk.

Having 112 files and documents in about half the space of a 320K disk means the files average less than 1.5K each. If the disk holds a large number of small memos or letters, another solution to accessing the free space

The Help Screen

on the disk is possible without upgrading to DOS 2.00. Use DOS's COPY command to combine several of your small documents into one large document. Then ERASE the small documents, reducing the number of file entries in the disk's directory. The unused part of the disk is now available for storing new files, as the disk will now have space in the directory for new entries.

The format for combining files with the COPY command is
COPY B:X.DOC + B:Y.DOC B:Z.DOC
This creates the file Z.DOC by copying X.DOC and then appending a copy of Y.DOC. You do not have to specify a name for the result file. You could shorten the command to
COPY B:X.DOC + B:Y.DOC

However, when a result file name is not specified, the result file is given the name of the first of the files to be combined (X.DOC in the example).

You can easily find a particular memo or letter within the large combination document by using the word processor's search function to find a unique set of characters (for example, a correspondent's last name).

Subdirectory PATHs

Q. We have had our IBM XT with DOS 2.00 for about two months and have developed a certain amount of confidence and expertise in using it. It has become obvious that file management, and therefore the tree-directory system, in DOS 2.00 is a significant feature. However, neither the IBM DOS manual nor any other book that I've seen has done a good job of demonstrating (beyond command definitions) the power of tree-structured directories. Any suggestions you could provide on how to make use of them would be appreciated.

Specifically, the purpose of the PATH command is stated in the DOS manual as, "Causes specified directories to be searched for commands or batch files that were not found by a search of the current directory." This suggests that you can have your cake and eat it too. I put a PATH command in our AUTOEXEC batch file and hoped to be able to run Lotus's

DOS will search the directories set by the PATH command if the commands are not found in the current directory of the default drive.

1-2-3 even when the current directory did not contain 1-2-3. We have been unable to use files without using the DOS command CD to change directories.

Must a file be either a .COM or .BAT file to be accessed from a different directory via the extended search path set by the PATH command?

*Harold A. Eaton
Houston, Texas*

A. No, a file does not have to be either a .COM or .BAT file to be accessed via the extended search path. But the file name must be used on the DOS command line (the line following the DOS prompt) as a command, not as a file name parameter to a command.

For example, let's assume you have a hard disk as drive C: with a subdirectory called DOS containing the DOS file COMP.COM and another subdirectory on a floppy disk in drive A: called SUB containing the file PRG.COM. Let's also assume that you have changed to a directory on drive A: that does not have any of these files (let's call it NONE). Now issue the command PATH C:\DOS; A:\SUB to define the paths to these two additional directories so that they will be searched if a command is not found in the current directory of the default drive (see Figure 1).

In the command COMP PRG.COM C:PRG.COM the first "word" entered on the command line, 'COMP', is the command, and the "words" or characters that follow, 'PRG.COM' and 'C:PRG.COM', are the command's parameters. COMP will try to find the two files specified as the command's parameters, compare the files byte for byte, and inform you whether or not the files are the same. So when COMP is not found in the current directory of the default drive (A:\NONE), DOS will search the directories set by the PATH command one at a time, in the order they were defined, until the file is found (COMP will be found in the C:\DOS directory).

But the file PRG.COM will not be found. Because the file name PRG.COM is being used as a parameter of the command COMP and not as a command itself, DOS will search only the current directory of the default drive for this file. Therefore, to find PRG.COM, you must prefix the file name with the path to the directory in which it resides. The path to C:PRG.COM, of course, must also be specified. So if the path to the sub-

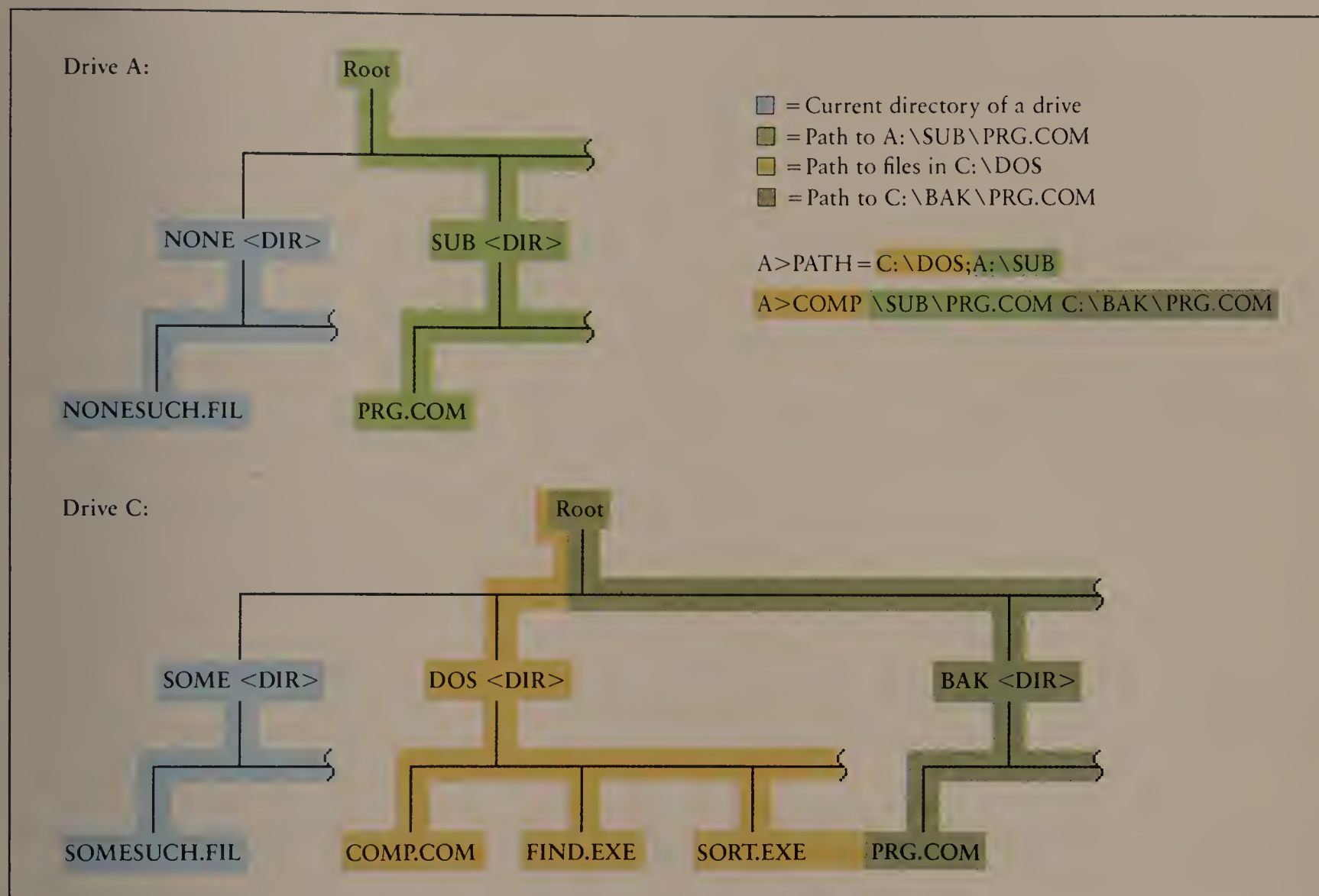


Figure 1: DOS will search directories defined by PATH for a command not found in the current directory of

the current drive, but a file name parameter must be prefixed by the path to its directory.

directory containing C:PRG.COM is C:\BAK, the command should be

COMP A:\SUB\PRG.COM

Generally DOS commands invoke .COM, .BAT, or .EXE files and are entered directly after the DOS prompt. DOS commands can also be written on the command line following the vertical bar character (|), which is used to chain together commands; the output of the command preceding the vertical bar is used as

input to the command following.

Therefore, if the subdirectory DOS containing the DOS files FIND.EXE and SORT.EXE has been included in the PATH definition, the command DIR C: | FIND "<DIR>" | SORT > SUBDIRS will find and sort all the subdirectory names in the current directory of drive C: and write the results into a file called SUBDIRS in the current directory of the default drive (C:). DOS will search the directories set by the PATH command if the commands FIND.EXE and SORT.EXE are not found in the current directory of the default drive.

When loading the Lotus Access System or 1-2-3 itself, the support files needed to load the main program properly (such as the configuration file 123.CNF and the terminal driver TD.DRV) are not specified as parameters on the command line and therefore must be in the current directory of the default drive. However, once loaded, version 1A of 1-2-3 will allow you to read and write files to different subdirectories. The subdirectory that your files will be saved to and read from is set through the

The Help Screen

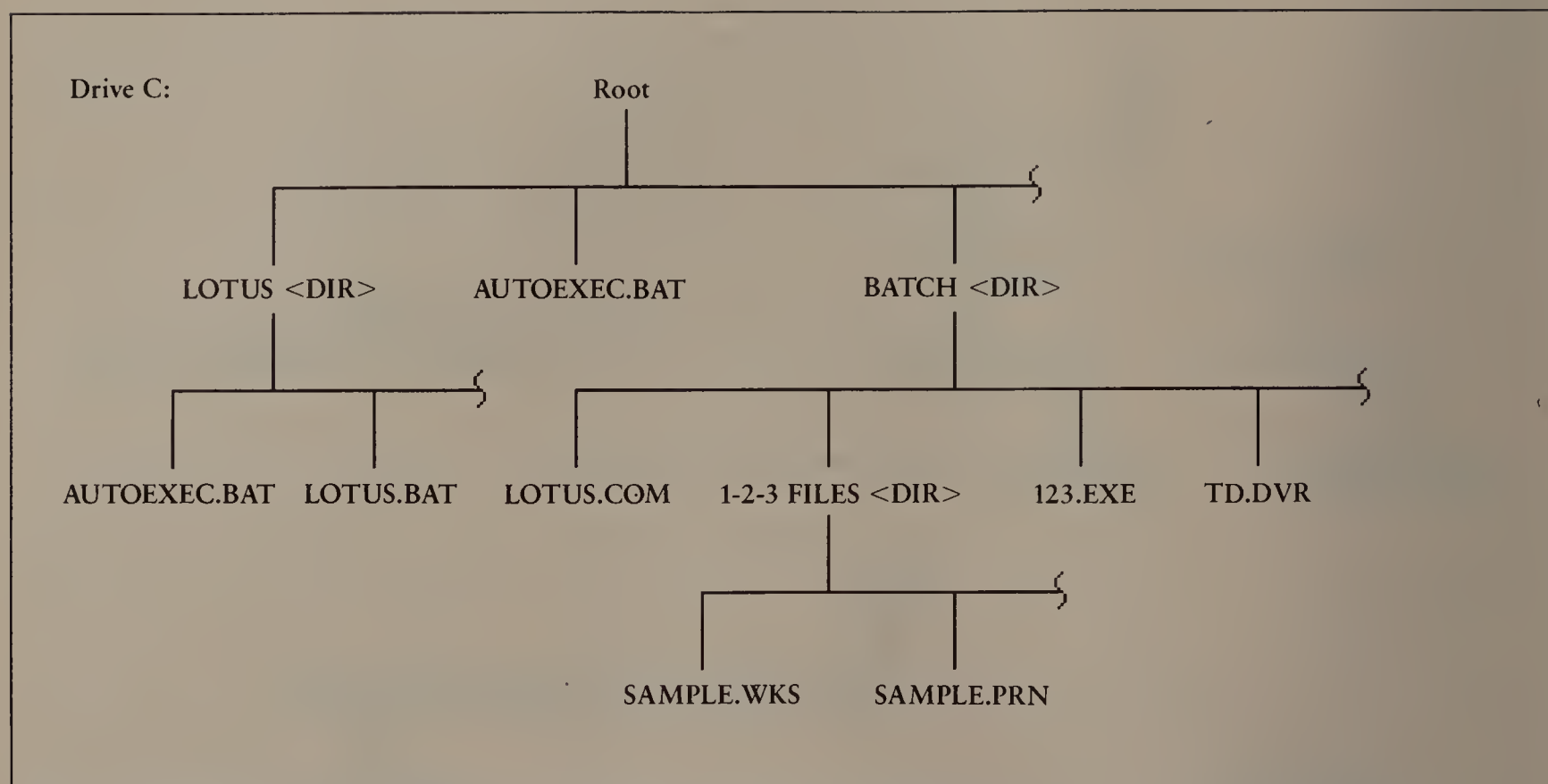


Figure 2: Subdirectory arrangement, used with a PATH that includes C:\BATCH, to facilitate using 1-2-3 from a hard disk

1-2-3 command /File Directory. The following procedure may help you use 1-2-3 from your hard disk.

First you will need a subdirectory that contains all the necessary 1-2-3 files. To create it, change to the root directory of the hard disk (with the command `CD C:\`), make a subdirectory called LOTUS (`MD C:\LOTUS`), and copy all the 1-2-3 files into this subdirectory (`COPY A:.* C:\LOTUS`). Next you will need a subdirectory in which to keep your worksheet, graph, print, and other files. This subdirectory can have any name, but it must be created before it can be used. Let's make it a subdirectory of the subdirectory LOTUS and call it 123FILES (`MD C:\LOTUS\123FILES`). You

will also need a subdirectory called BATCH (`MD C:\BATCH`) to hold the batch file LOTUS.BAT. Now to make LOTUS.BAT, type the following:
`COPY CON C:\BATCH\LOTUS.BAT <Enter>`
`C: <Enter>`
`CD C:\LOTUS <Enter>`
`C:\LOTUS <Enter>`
`<F6> <Enter>`

Next add the path C:\BATCH to the set of directories defined by the PATH command in the AUTOEXEC.BAT file. (It's a good idea to keep a copy of the AUTOEXEC.BAT file in the BATCH subdirectory, too, in case the original in the root directory is overwritten.) Now you can access the file LOTUS.BAT regardless of what the current directory or default drive is. LOTUS.BAT will change the default drive to C: and the current directory on drive C: to the

subdirectory LOTUS. If your original Lotus System Disk is in drive A:, LOTUS.BAT will load the Lotus Access System from the Lotus subdirectory. Figure 2 illustrates this arrangement.

More information on the PATH command and DOS 2.00's tree-structured filing system can be found in "MS-DOS 2.00: A Hands-On Tutorial" (PCW, Vol. 1, No. 3).

IBM's Hardware

Q. I have two questions that I would like very much to have answers for. They both relate to the PC XT. First, the XT comes equipped with an asynchronous communications board installed as COM1:. I

have added a Hayes internal modem that, for compatibility with some important communications software, I have to use as COM1:. To do this I have had to remove the IBM asynchronous board. I would like very much to reinstall the asynchronous board as COM2:, but there are no switches on it or any documentation on how this might be done. I have been told that it is possible, but no one has been able to tell me how to do it.

Also, there are times when I really don't need to use my hard disk, such as when I am working for hours on a mainframe and just use my XT as a terminal. Since my warranty has expired anyway, I don't mind experimenting if I have some guidance. Could I install a switch someplace and boot my system without the hard disk when it is not needed? If this is possible, would it be worth saving a few hours of idle running time on the hard disk? I know it would be quieter and more enjoyable working without it when I don't need it.

Bob Stephan
Pebble Beach, California

A. The IBM Asynchronous Communications Adapter does not have any switches, but there are two "programmed shunt modules" located in two sockets next to the board's mounting bracket, one in the top row of chips and one in the bottom row (see Figure 3). The programmed shunt modules each have a dot painted at one end and may be plugged into their sockets with the dot up (towards the top of the board) or

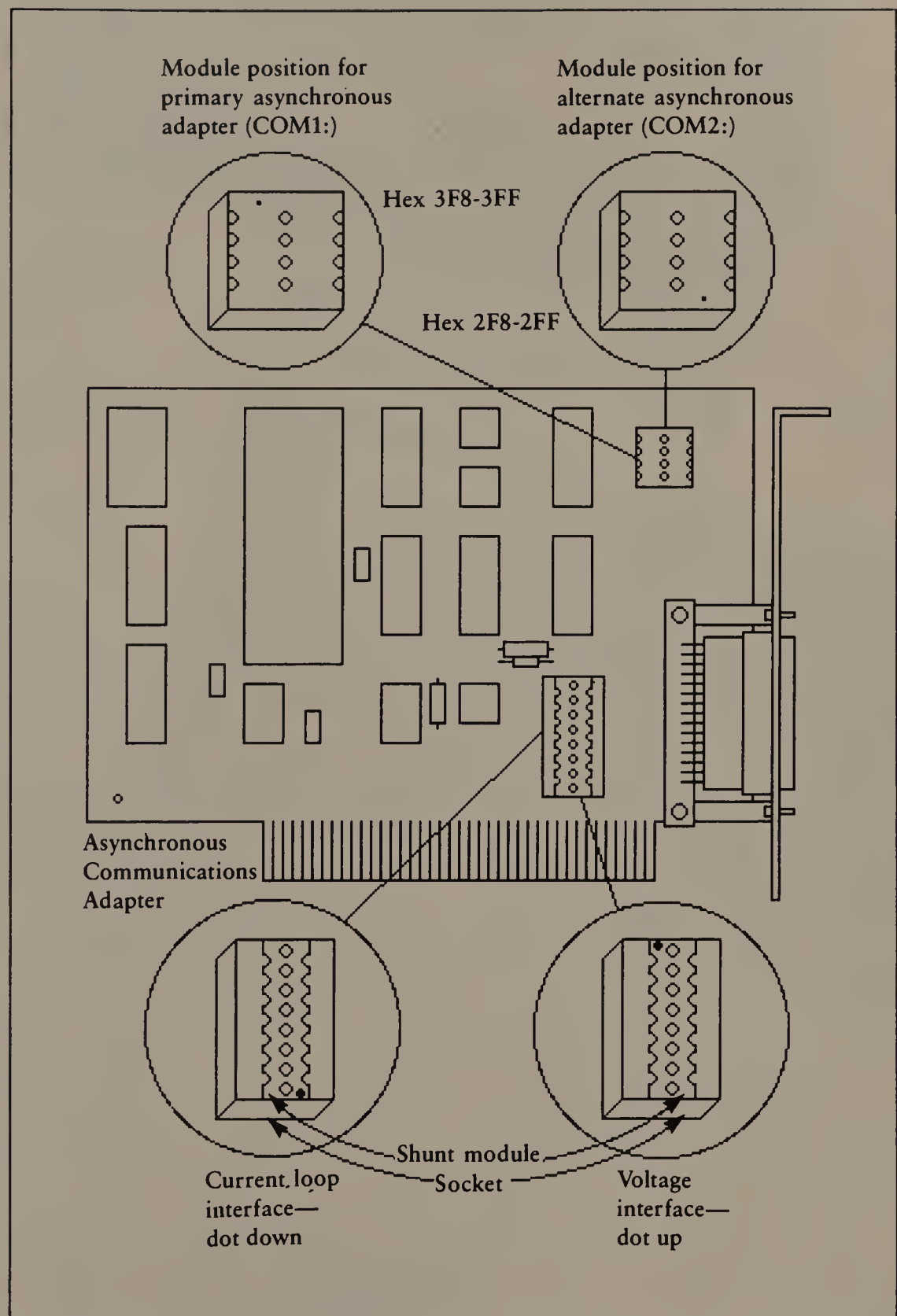


Figure 3: Selecting the interface format and adapter address for the IBM Asynchronous Communications Adapter

HIGH PERFORMANCE PRINTING

NOW AVAILABLE FOR YOUR IBM PC*

A first-class computer deserves a first-class printer. A proven high performance printer with abilities that match its reputation. A Datasouth. High performance Datasouth printers come in two models. The DS180 is a legendary workhorse that delivers crisp data quality printing at 180 CPS. The new multimode DS220 cruises at 220 CPS for data quality tasks and at 40 CPS for letter quality word processing. Both models print dot-addressable graphics. Visit your dealer and choose the high performance Datasouth printer your IBM PC deserves.

Datasouth printers are available nationwide through participating Computerland stores and other fine dealers

datasouth

HIGH PERFORMANCE MATRIX PRINTERS

*A trademark of IBM

Datasouth Computer Corporation
Box 240947 Charlotte, NC 28224
Call Toll Free
1-800-222-4528

Circle 685 on reader service card

The Help Screen

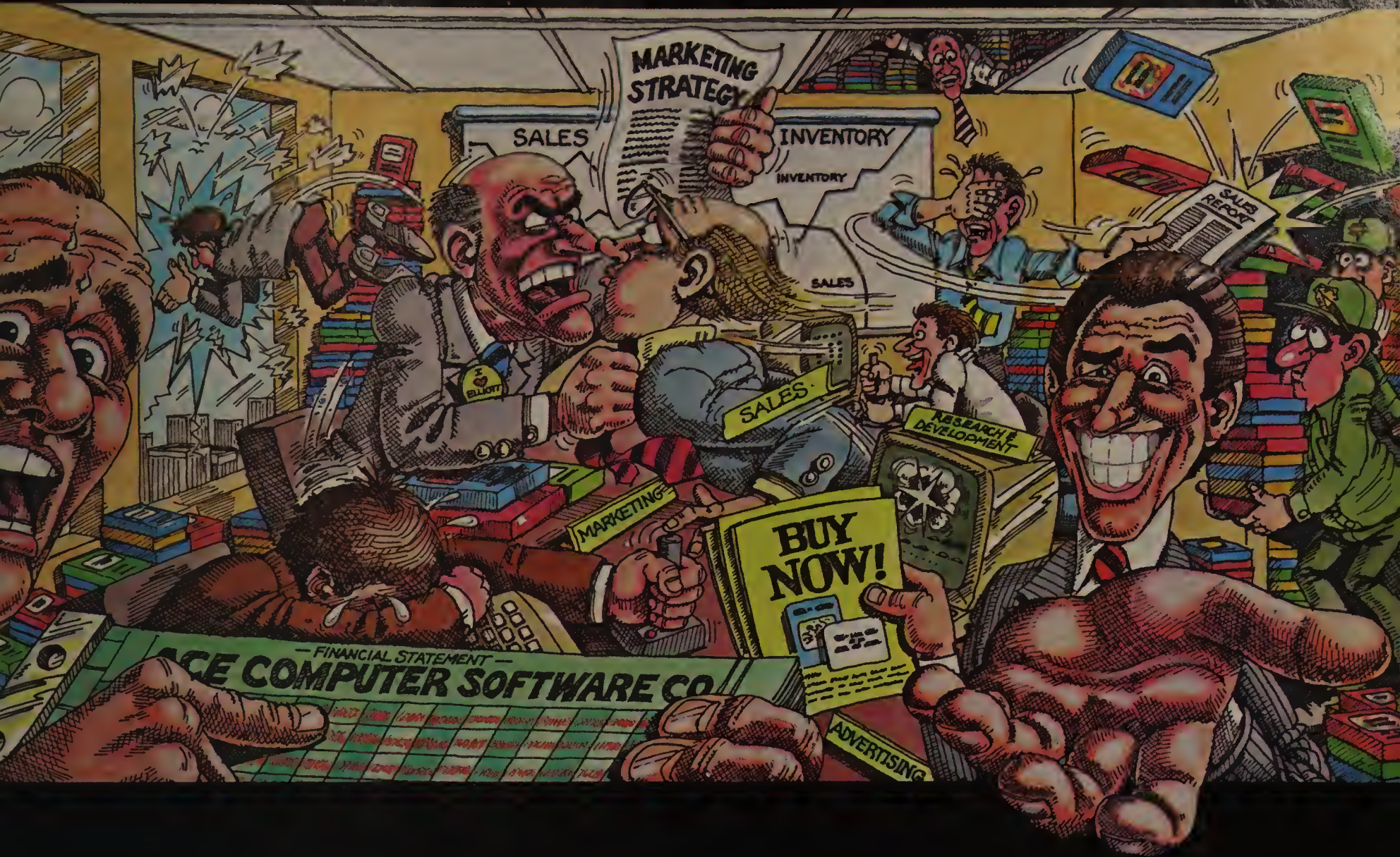
with the dot down (towards the bottom). The module in the bottom row selects the serial interface format; the current loop interface is selected if the dot is down and the voltage interface is selected if the dot is up. The module in the top row selects the adapter address; the address is set for COM1: if the dot is up and for COM2: if the dot is down. To re-install the board as COM2:, just flip the module in the top row.

As to your second question, you can install a switch in the hard disk's power line inside your XT to disable the hard disk when you don't need it. When you boot up the XT with the hard disk disabled, you will see the error message '1701' after the memory test is completed. This message may be ignored; it simply means the hard disk is not working. This may make working quieter and more enjoyable, but I doubt it will extend the life of the hard disk significantly.

You should turn the newly installed switch on and off only when the XT is off; turning the hard disk on or off while the computer is on may produce voltage surges, corrupting memory and locking up the computer. Another caution, since you often don't use the hard disk: when you need to relocate the computer, don't forget to "land" the heads of the hard disk. This procedure, which is on the XT Diagnostics Disk, positions the heads away from the portion of the disk that holds data in order to protect the data from possible damage during shipping.

Do you have any questions concerning the IBM PC or compatibles? Send them to The Help Screen, PC World, 555 De Haro St., San Francisco, CA 94107. ●

BRUTAL! RUTHLESS! UNPREDICTABLE!



**IN THIS GAME,
YOU REALLY GET
THE BUSINESS.**

Okay, boss, now what do we do? Research & Development is working 'round the clock coming up with new products, the warehouse is overflowing, the advertising agency wants more money, your customers are fickle, and the competition just slashed their prices. We're all waiting for your decision.

Put yourself at the helm of this enterprising new software company. Every major decision is in your hands. Use your logic and intuition to spot market trends. Keep a close eye in your balance sheet. Get a grip on your company, a leg up on your competition, and a stranglehold on the market. Do you have what it takes to be King of Silicon Valley? Or will you end up selling apples on skid row?

Intense strategic challenge combined with a real education in the workings of big business make *In The Chips* one game anyone can profit from.

IN THE CHIPS.™ Concept Education for the VIC-20, Commodore 64, IBM PC and PCjr.



C R E A T I V E S O F T W A R E

VIC-20™ AND COMMODORE 64™ ARE TRADEMARKS OF COMMODORE ELECTRONICS LTD. IBM PC AND PCjr ARE TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES, INC. © 1984 CREATIVE SOFTWARE

Circle 20 on reader service card

Don't buy Omninet just because it's the #1 network.

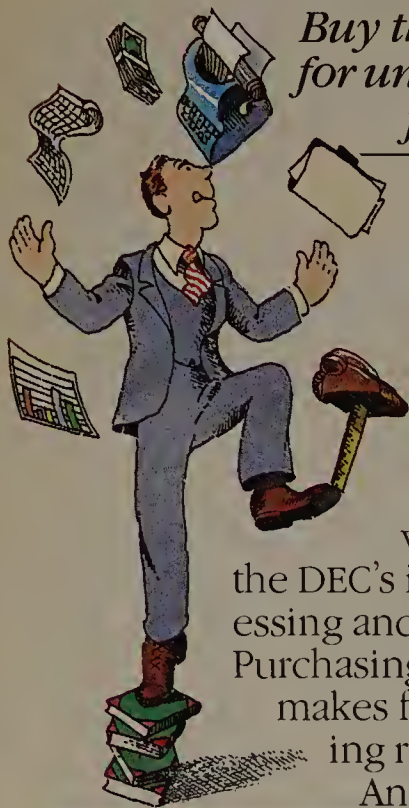
Buy it because it's the best buy.

At under \$500 per node, OMNINET has the lowest cost per station of any local area network.

Because an OMNINET Network uses simple, twisted pair wire. Which means that cabling costs one fifth of the coaxial alternatives, with none of the installation headaches.

Result? OMNINET is both easier and less expensive to install. Or expand.

Buy the system for unmatched flexibility.



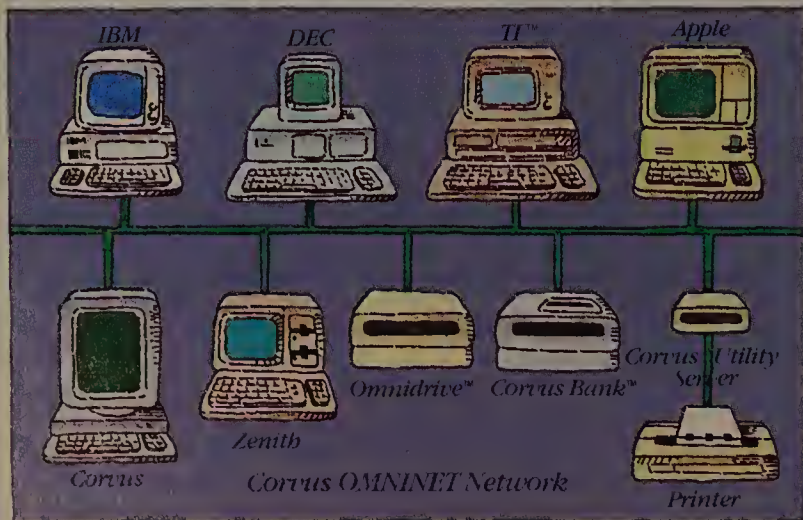
From Apples to Zeniths, OMNINET handles more types of micros than any other network. So keep

the DEC's in Data Processing and the PC's in Purchasing; OMNINET makes for great working relationships.

And starting with

options like electronic mail, your people can choose from over 500 different programs according to their needs. Not their network's limitations.

What's more, CORVUS can handle all your hardware needs. From 6 to 45MB hard disks through 200MB Random Access backup at an amazing \$11 per megabyte. Both, with OMNINET servers built right in.



Buy the OMNINET Network for the most expandability.

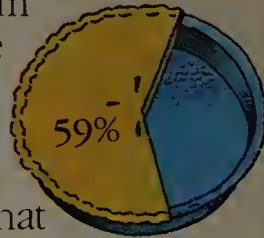
If you're just starting a network, consider OMNISHARE™ Software. It lets your regular PC's or PC-compatibles make full use of the disk space on an IBM PC XT.™

When you want to draw on the resources of your central computer, you'll want Corvus' SNA Gateway. It lets your network's micros tap into your mainframe's information.

Whether you have 2 computers or 2,000, OMNINET can get the most out of them.

Buy us for our experience.

We pioneered local area networking for micros. And we're constantly working on better ways to give you the system you need, with the versatility you want, at a price that makes sense.



With the result that 3 out of every 5 locally-networked micros in the world are connected to a CORVUS network.*

Give us a call at 800-4-CORVUS to find out more.

Because when it's all said and done, one of the best arguments for going with an OMNINET Network is really very simple.

Buy it for your peace of mind.

CORVUS
The Networking Company.

*59% of all locally-networked micros operate in a CORVUS network, according to InfoCorp. CORVUS, THE NETWORKING COMPANY, OMNINET and OMNISHARE are trademarks of CORVUS SYSTEMS INC. IBM PC and PC XT are trademarks of International Business Machines. APPLE is a trademark of APPLE COMPUTER INC. DEC is a trademark of DIGITAL EQUIPMENT CORPORATION. Zenith is a trademark of Zenith Corporation. TI is a trademark of Texas Instruments.

**This
"Finger
Friendly"
keyboard**

Finger Friendly

will make you more productive everytime you turn on your IBM PC.

Do you love your PC, but hate its keyboard? Would you like to have a quiet keyboard, with keys in the standard typewriter position? Now there is a low cost alternative to the IBM keyboard. Look at the improvements:

- ☐ **A Wider, Left Hand Shift Key/in the Standard Typewriter Position.**
- ☐ **Full Width Return Key.**
- ☐ **Lighted Indicators on CAPS LOCK and NUM LOCK Keys.**
- ☐ **A Long ENTER Key Next to Ten Key Pad for Adding Machine-Like Entry.**
- ☐ **Long Life, Capacitive Key Switches with Micro-processor Control.**
- ☐ **No Irritating Clicking Sound.**

- ☐ **Finger Homing Bumps on F, J, and 5 Key of Numeric Pad.**

- ☐ **Two Stage Key Resistance Gives Tactile Feedback Through Your Fingers, not Your Ears.**

And those are just the improvements! You don't have to give up the color matched, low profile case. Or three position height adjustment. It's the enhancement that will make you more productive everytime you turn on your PC.

About Us

Although we sell our products direct to you, don't confuse us with mail order companies. You see, we only sell a few selected products, which we stock in depth, and service right here in our own facilities. So you get the mail order sized price, and support based on extensive experience with our products. When you call us you get informed answers.

Whether it's a Qubie' modem, standby power system, multi-function board, or keyboard—we are ready to help you before and after the sale. And if you would rather buy from a local

DEALER INQUIRIES INVITED



dealer, no problem. Many dealers now stock Qubie' products, with more adding them each day.

All our products come with our 30 day satisfaction guarantee. If you are not completely satisfied you may return the keyboard for a refund, including the postage to send it back. In fact, we suggest you get a competitor to make the same offer, buy both products, and return the one you don't like. We know which one you'll keep.

IBM is a trademark of International Business Machines Corporation.

Order Today, Shipped Tomorrow!

Price includes UPS surface freight and insurance. Add \$7.50 for two day air service. For fastest delivery send certified check or credit card. Personal checks take 18 days to clear. Calif. residents add 6% sales tax. Corporations and Institutions call for purchase order details.

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
Camarillo, Ca. 93010

Tempo House, 15 Falcon Road,
London SW11 2PH, United Kingdom

Copyright Qubie' 1984

Qubie' Finger Friendly Keyboard,
with 1 year warranty.
Part No. FF5150 **\$169.**

Circle 605 on reader service card

How Can You Avoid Getting Trapped Under An Ancient Word Processor?



Buy Word Perfect!

Once upon a time, word processors were monstrous things. Dot commands, page orientation, and separate editing, formatting and printing programs turned them into lumbering beasts. Only a well-educated programmer would dare don his armor and tackle such a beast — not a pleasant task for a modern secretary, executive, or writer.

Then came WordPerfect and the beast was slain.

WordPerfect was designed to work for you not against you. WordPerfect has no command language to complicate your writing. Pressing a single key is all it takes to

bold, underline or center.

When writing, you don't want to worry about page formatting, making room for headers or footers, or

whether you are in "edit" or "create" mode. Your word processor should do it automatically and WordPerfect does. WordPerfect lets you think in terms of ideas, not pages. It is simple enough that you quickly forget about the mechanics and your writing flows easily.

So if you don't want to be caught under a word processing monster, try WordPerfect. We're certain it will improve the quality of your writing.

WordPerfect

**You'll love it —
not only for the features
we've built in, but
also for the
antiquities
we've
left out.**



SATELLITE SOFTWARE INTERNATIONAL

288 WEST CENTER STREET, OREM, UTAH 84057 (801) 224-4000 TELEX 820-618

SSI

ORCHID REWRITES AESOP'S FABLES



With PC TURBO...Speed Wins the Race.

In business, success comes to those who win the race against deadlines and competition. The IBM™ PC is a great tool, but valuable time can be wasted waiting for it to recalculate spreadsheets, retrieve data, or execute the newer and more complex software packages. PCturbo™, new from Orchid, can help you win and enjoy the fruits of success.

PCturbo is the ultimate IBM PC productivity enhancement. It boosts the execution speed of your PC so you can get more done in less time. And it's transparent to existing programs such as WordStar™, Lotus 1-2-3™, and dBase II™. So, with PCturbo, your PC looks and acts the same as before; it just runs faster.

Who needs PCturbo? Anyone who ever waits for their PC to finish executing so they can run something else. Programmers wait-

ing for compilers to finish before testing a new feature. Businessmen waiting for a data base to retrieve account information. Word processors waiting for the spelling checker to finish before printing.

PCturbo does more than just speed up the PC. It extends the life of slower, older pro-

grams. It provides a base for new sophisticated software. And it protects your PC investment. You get your work done quicker and decisions made sooner. The very reasons you got a computer in the first place. Write or call for more information.

TECHNICAL DETAILS:

Hardware

- One slot plug-in board with high-speed 16-bit processor (8086 or 80186)
- Up to 640K on-board memory for a maximum of 1.28 Mbytes total PC memory.
- Simple "one step" installation.

Software

- Runs IBM PC-DOS 2.0/1 on either the IBM PC or XT.
- Provides disk caching, RAM disk using available PC memory up to 640 Kbytes.
- Concurrent program execution available soon.



ORCHID TECHNOLOGY
47790 Westinghouse Drive
Fremont, CA 94539
(415) 490-8586 Telex: 709289

PCturbo is a trademark of Orchid Technology. IBM PC and XT are trademarks of International Business Machines Corporation. WordStar is a trademark of MicroPro. Lotus 1-2-3 is a trademark of Lotus Development Corporation. dBase II is a trademark of Ashton-Tate.

Circle 133 on reader service card

Let MULTIGRAPHTM EXPAND YOUR IMAGE



IBM Color Mode plus
640h x 200v - 16 colors
640h x 400v - 16 colors
Parallel Port
Soft Scroll

IBM Monochrome Mode plus
High Resolution Graphics
132 Columns Display
Parallel Port
Soft Scroll

All This and More on One Expandable Card

Multigraph gives you the greatest value among all graphics adapter boards! Only Multigraph offers you a choice between using your monochrome or color monitor with all these options. Only Multigraph offers you an inexpensive 132-column-width option in monochrome. Only Multigraph offers you optional smooth scrolling! Only Multigraph offers you increased operating speed made possible by a 32 bit internal architecture...like a mainframe!

Begin With The Base Configuration Compatible with IBM PC and XT, Multigraph has several important standard features. In monochrome, it offers graphics with a high resolution of 720h x 350v (Lotus 1-2-3 compatible). In color and monochrome, it offers full 32K on board memory, flicker-free scrolling, and 32 bit internal architecture.

Expand With A Wide Variety Of Options The many Multigraph options will upgrade your system as your needs change. Available is printer interface for any parallel port printer and "soft scroll" smooth scrolling.

In color you may up grade to 640h x 200v or 640h x 400v resolution in 16 colors. In monochrome you may upgrade with graphics of high 720h x 700v resolution and 132 column convenience. Available in both monochrome and color is a full 128K on-board display buffer memory.

Available through personal computer dealers. For further information or name of local dealer call:

Profit Systems, Inc.

30150 Telegraph Rd. • Birmingham, MI 48010 • (313) 647-5010

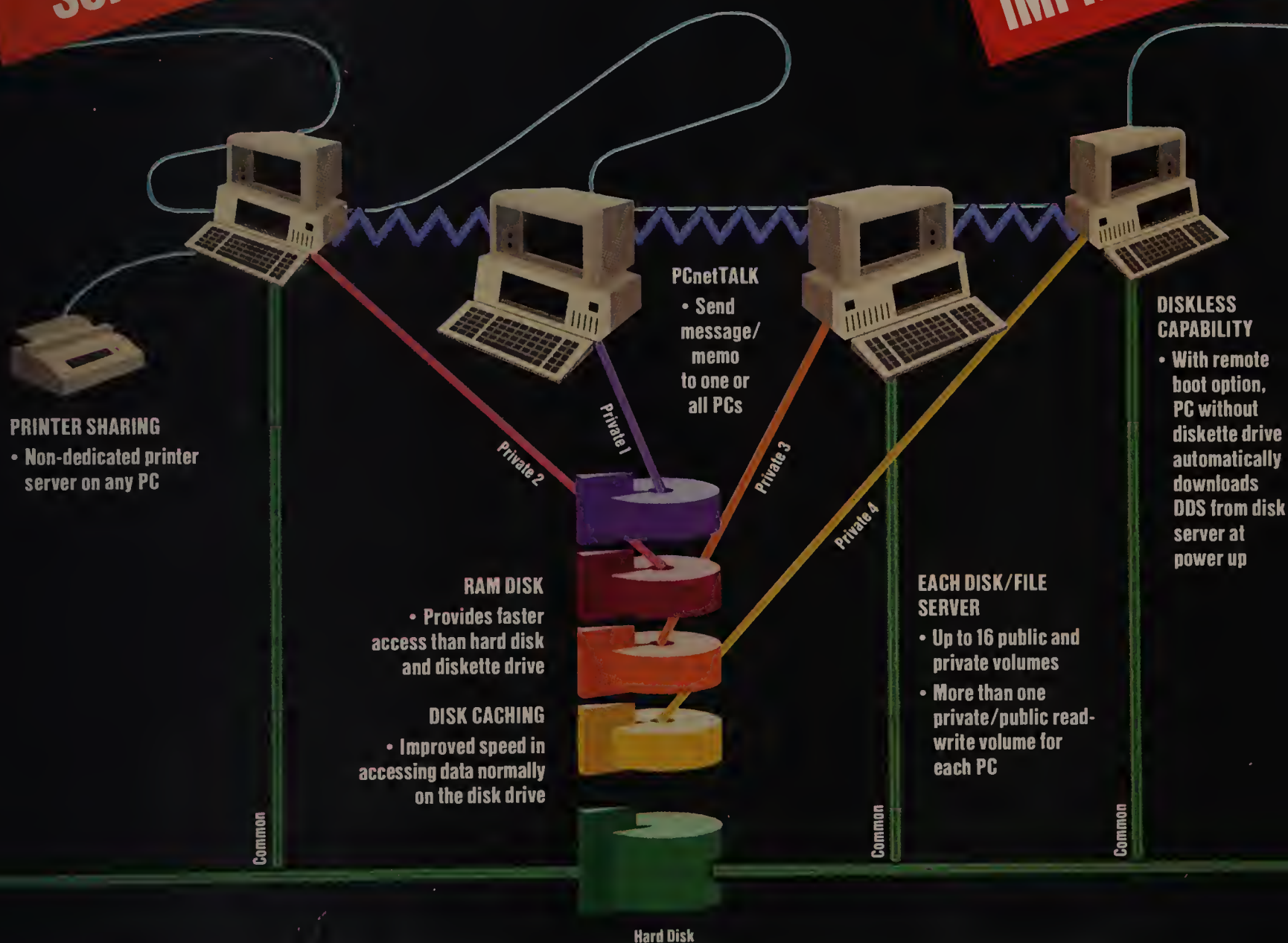
IBM is a trademark of International Business Machines, Inc.
(TM) indicates trademark of Profit Systems, Inc.

Copyright 1983 Profit Systems, Inc.
1-2-3 is a trademark of Lotus Development

Circle 468 on reader service card

NEW SOFTWARE

**PCnet SPEED
IMPROVEMENT**



(415) 490-8586 Telex: 709289

Circle 133 on reader service card

Compaq Settles Down and Powers Up

Ken Greenberg

Compaq's second major product is the Deskpro, a high-performance PC-compatible desktop computer. Compaq's first product without a handle is much more than a clever marketing move. It shows that Compaq, the number-two seller of 16-bit computers, is serious about entering the competition for corporate desk tops—a move that puts this young, successful company in a head-to-head battle with IBM.

The Deskpro line includes four desktop computers, featuring modular pricing for modular components. For most users the Deskpro's salient qualities are storage, speed, and PC compatibility. For dealers the Deskpro line promises the same product flexibility as the PC itself. Each Deskpro unit includes space for four storage devices within the system unit, two to three times the processing power of the PC, a hefty power supply, and a predictable talent for running off-the-shelf PC software.

Gary Stimac, chief engineer for the product, says the Deskpro line was designed to take advantage of the increasing sophistication of both users and software. Within the personal computer business market, Compaq is aiming at both "power users"—those who seek the horsepower and the memory required to run such integrated, graphics-oriented packages as *Symphony* and *Framework*—and users with less ambitious computing needs.

Variations on a Theme

All Deskpro models are built from the same system unit, which includes an Intel 8086 microprocessor (a true 16-bit version of the PC's 8088), an 8087 socket, a 200-watt power supply, seven full-size expansion slots, and one short slot. Two of the full-size slots hold the floppy disk controller and video boards, both of which are standard equipment. The floppy disk controller board also contains a parallel printer port, while the video board supports RGB and composite color graphics displays. All

The Deskpro's salient qualities are storage, speed, and PC compatibility.

disk drives are half-height and shock mounted. The unit also sports a redesigned Key Tronic keyboard.

The Deskpro's detachable keyboard plugs into the front of the system unit. Unlike the Compaq portable's mushy keyboard, the Deskpro's keyboard has a snappy action and features lights on the <CapsLock> and <NumLock> keys. As with the portable, each <Ctrl>-<Alt>-<+> keystroke combination raises the volume of each key click; <Ctrl>-<Alt>-<-> reduces the volume.



The Deskpro, Compaq's modular machine

The Deskpro comes with three basic memory configurations installed on the system board: 128K RAM and 256K RAM—both using 64K RAM chips—and 640K RAM, relying on both 64K and 256K RAM chips.

The entry-level Deskpro, the Model 1, includes 128K RAM and one 5¼-inch, double-sided, double-density, 360K floppy disk drive, leaving six slots available for expansion boards. Mike Swavely, marketing director for Compaq's new Office Computer Division, identifies the Model 1 as "the minimum configuration desirable for the business user, our target market." At press time Compaq's suggested retail price for the starter unit was \$2570.

The company is banking on the Model 2 to be its bread-and-butter desktop seller. This version comes equipped with 256K RAM, two floppy disk drives, and six free expansion slots. It lists for \$3170. Model 3, Compaq's PC XT equivalent, priced at \$5170, sports 256K RAM, one floppy disk drive, and a 10MB hard disk drive. The Model 3 also includes a hard disk controller board, which can accept a second hard disk drive, and a combination serial port and clock/calendar board in the short slot, leaving four full-size slots available for expansion.

At \$7370 the Model 4 is the Deskpro flagship. Boasting 640K RAM on the motherboard, it augments its single floppy disk drive with a 10MB hard disk drive and Compaq's 10MB Fixed Disk Backup, a tape backup system. The unit also includes the combination

serial port and clock/calendar board. The same controller board that can handle two floppy disk drives also controls the tape backup system—leaving four expansion slots free. While the company has no plans to promote the Model 4 heavily as a local area network file server, Compaq

President Rod Canion says such an application makes "ideal" use of the unit's speed and hard disk storage capacity.

Options for the Deskpro line include a 12-inch green or amber dual-mode (text and graphics) display for \$325, a tilt-and-swivel base for the monitor, and Desk Saver, a raised platform that lets you tuck the keyboard beneath the unit. MS-DOS 2.00 and Microsoft BASIC 2.1 are available, with reference manuals, for \$60. Compaq may eventually release an optional 20MB hard disk drive, which will be run by the same controller board as the 10MB hard disk.

Since each model is a variation on the same theme, Compaq has made upgrades from model to model easy for user and dealer alike. If you move from Model 2 or 3 to Model 4, however, you'll need to remove 18 64K RAM chips to make room for the Model 4's 256K memory chips.

Mike Swavely (left), flanked by engineer Gary Stimac, outlines Compaq's marketing strategy for PC World Editors Ken Greenberg (upper right) and Karl Koessel.



Two-Speed Compatibility

The Deskpro features a speed mode indicator light on the front of the system unit that tells you the current processing speed. When you're operating at the 7.14 MHz rate of the 8086, the light is green; a red light indicates that the machine is working at the 8088's 4.77 MHz rate. Pressing <Ctrl>-<Alt>-<\> at any time toggles the Deskpro's processor to the other speed. Most programs run two to three times faster when the Deskpro is running at 7.14 MHz.

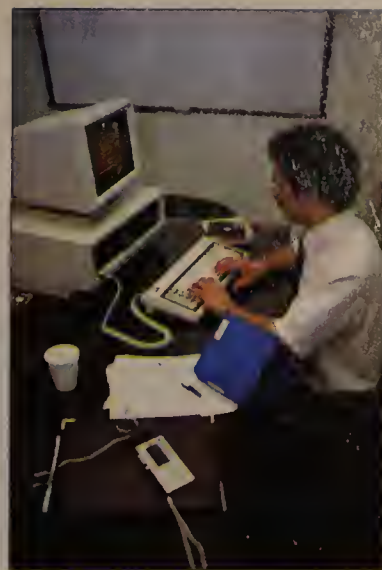
The Deskpro's BIOS ROM is an updated version of Compaq's original ROM—the source of its unparalleled PC compatibility—with speed-dependent routines corrected so that they run on both the 8086 and 8088 processors. The revised ROM will be installed in new Compaq and Compaq-Plus portables.

Chief Engineer Stimac describes the retention of Compaq's level of PC compatibility as an issue not subject to compromise. Stimac and his crew worked on ROM revisions in conjunction with a dozen major software developers, including Microsoft and Lotus Development Corporation. He acknowledges that the firm did "quite a bit of engineering" to get the 8086 microprocessor, which relies on a 16-bit data bus, to converse with expansion boards for the 8088, which uses an 8-bit bus. Compaq redesigned bus controllers to permit the 8086 to accept data from an 8-bit bus. According to Stimac, that means "full IBM PC board compatibility"—

in other words, the same 8-bit expansion boards that work in the Compaq portable also work in the Deskpro series.

While shifting into overdrive increases clock rate, compatibility doesn't depend solely on clock speed. The 8088 contains an internal 4-byte instruction queue, which is essentially a buffer that holds a sequence of instructions; the 8086 has a 6-byte queue. The bigger queue results in more efficient operation: because one call fills a queue, the 8086 spends less time retrieving instructions from RAM. Thus Stimac and his crew wrestled with—and apparently reconciled—the different execution times that arise from the different queue sizes. The result is an 8086 that fully emulates the 4.77 MHz 8088.

PC World tested a Deskpro prototype at Compaq's Houston headquarters. The machine booted up and ran PC-DOS 2.10, *WordStar*, and *Keynote* without a hitch. Version 1.0 of *1-2-3* ran flawlessly under DOS 1.10, while *Cosmic Crusaders*, which uses a timing-sensitive copy-protection scheme, loaded effortlessly. It ran in both speed modes, but at 7.14 MHz it overwhelmed Technical Editor Karl Koessel's lightning reflexes.



Technical Editor Karl Koessel begins a battery of tests on the Deskpro.

Mike Swavely, marketing director of Compaq's Office Computer Division, stresses the importance of the company's dealer network.



Compaq engineer Gary Stimac demonstrates the Deskpro's graphics capability.

The Modular Machine

Karl Koessel

The modular design of the Deskpro chassis and the availability of expansion boards, storage devices, and even RAM chips from Compaq dealers allow you to start small and expand the Deskpro computer system as your needs and expertise grow. Compaq has also structured the price of these components so that you end up paying the same amount for the Deskpro and added upgrades as you would have paid if you had bought them all at once. Although Compaq is promoting the Deskpro as four differently configured models, it can be customized to your particular needs using either Compaq or third-party expansion options.

The Deskpro chassis has four identical half-height compartments for mass storage devices. This means that a Compaq half-height floppy disk drive, hard disk drive, or tape backup system can be mounted in any of the compartments. Thus, the Deskpro can hold two floppy disk drives, a hard disk, and a tape backup system all in the same system unit—without any external cabinets, power supplies, or cables. In contrast, IBM offers only full-height floppy and hard disk drives for the PC's two full-height compartments.

Expansion Options

In addition to the standard 128K of RAM, the system board of the entry-level Deskpro includes 18 empty memory chip sockets (as does a 128K Compaq, PC, or XT). The architecture of the Deskpro requires that you fill all of these sockets when adding memory to the system board. Since either 64-kilobit or 256-kilobit RAM chips may be used, filling these sockets boosts the entry-level model's memory to either 256K or 640K. Third-party memory expansion boards may also be used to increase the Deskpro's RAM.

The memory sockets of the Deskpro Models 2 and 3 come filled with 64-kilobit RAM chips. If you opt to increase memory by using 256K chips on the system board rather than by installing a memory board in an expansion slot, these chips must be removed.

Adding another half-height floppy disk drive to the Deskpro is a snap. You can install it yourself or have your Compaq dealer do it. The cable from the disk controller board to the first floppy disk drive has the connector for the second drive. You open the Deskpro chassis, slip a shock-mounted floppy disk drive into one of the compartments, tighten one screw to secure it, push the floppy disk controller board cable's connector onto the drive, flip a tiny switch on the system board, and close the chassis.

The 10MB half-height hard disk for the Deskpro is the same uniquely shock-mounted hard disk that is used in the Compaq-Plus (see "COMPAQ Gets a 10," *PCW*, Vol. 2, No. 2). Upgrading the Deskpro Models 1 and 2 with a hard disk takes only a few more minutes than adding the second floppy disk drive. In addition to the same basic installation procedure for all Deskpro mass storage devices, the hard disk controller board must also be installed in one of the expansion slots. The hard disk controller board and its cable can support two hard disks.

Anyone who has used BACKUP to store hard disk files on floppy disks will rejoice in the simplicity of the Deskpro's Fixed Disk Drive Backup, a removable tape cartridge backup system. The DC 1000 tape cartridge uses high-density tape in a 1/2-inch by 3/4-inch by 2 1/2-inch cartridge. You can back up selected files or the entire 10MB hard disk (which takes about 15 minutes) without the laborious chore of swapping floppies in and out of the drive. (Before files are backed up onto tape, the tape must be formatted, a one-time process that takes about 40 minutes.) And unlike the files created by the BACKUP command (these files cannot be used unless transferred back to a hard disk using the RESTORE command), the files generated by the tape backup system can be restored to floppy disks in a usable format. So if the hard disk is in the repair shop, you can use the hard disk files backed up on the tape system.

Installing the Fixed Disk Drive Backup is as simple as adding a second floppy disk drive or a hard disk drive. The tape unit fits in any of the



Engineer Gary Stimac displays a cartridge from the Fixed Disk Drive Backup unit.

Deskpro's four mass storage device compartments and is secured with one screw. The same cable that connects the two floppy disk drives to the controller board includes the connector for the tape drive. By using the same controller board for the floppy disk drives and the tape drive, Compaq gives removable tape backup to the Deskpro without using an additional expansion slot.

Included in Models 3 and 4 is Compaq's combination serial port and clock/calendar board, which fits in the Deskpro's single short slot and is

available as an upgrade option for Models 1 and 2. This board contains a PC-standard asynchronous serial port (RS-232C or current-loop operation), configurable as COM1: or COM2:, and a National Semiconductor clock/calendar chip (MM58167A). The clock may be disabled, and its battery is recharged when the Deskpro is on. Although a third-party expansion board with a clock/calendar may be installed in the Deskpro, the new Compaq ROM will, if Compaq's clock/calendar (or another clock utilizing the MM58167A) is present, automatically set the system date and time.

From Development to Desktop

Compaq officials maintain that the introduction of the desktop line was not a direct response to IBM's release of the Portable PC in February of this year. Planning for the Deskpro began in October 1983, but the project didn't leave the drawing board until January of this year. Compaq then lit a fire under its engineers, who produced a prototype in less than five months.

With the Deskpro, Compaq has applied current, but not untested, technology. The company considered and rejected machines based on Intel's 80186 and 80286 16-bit superchips. "The additional functionality of the 80186 wasn't PC-compatible," Stimac explains, while the scarcity of the 80286 precluded use of that chip for the Deskpro line. The company also vetoed production of a lap-size portable with built-in software, similar to Hewlett-Packard's recently announced machine. Compaq's marketing experts felt that such a product, which lacks the Deskpro's expansion capabilities, was too limited to appeal to the broad PC market.

Although not specifying the sources of the Deskpro's components, Marketing Director Swavely confirms that Compaq has locked up sufficient supplies of 8086 microprocessors and key subassemblies, including the 256K RAM chips. "We are getting an inordinate amount of capacity from some vendors," he says. One component Compaq can't get its hands on is a number-crunching 7.14 MHz 8087 chip, which Intel has not yet produced in volume. "We're really not selling this product on the basis of speed, since that is only one aspect of it," Swavely notes. "Our overall pitch is based on this being a better PC."

A Deal for Dealers

Relying on an 8086 chip may affect user perceptions of PC compatibility. For that reason H. L. Sparks, Compaq's vice president of marketing, says that Compaq will talk more about performance than processors. "Volume buyers could care less about what's inside, as long as it runs useful software," he notes.

Compaq's success, as the company often acknowledges, is due almost as much to its relationships with its 1350 dealers as to the quality of its computers. That successful formula stands unaltered with the Deskpro. Compaq is holding fast, for example, to its strategy of not competing with its dealers. Unlike IBM, the company doesn't have its own sales force or product centers. And according to Sparks and Swavely, the new product line is just what dealers asked for.

Room to Grow

With the introduction of its Deskpro line of desktop computers, Compaq has taken a giant step toward becoming a major force in the personal computer market. But the Deskpro announcement is best seen against the backdrop of a company experiencing unprecedented growth that it now seeks to direct.

In the space of one week last spring, Compaq expanded its operations to Europe, created a telecommunications subsidiary, and announced twin marketing efforts aimed at corporations and educational institutions. The most significant new development, however, was Compaq's reorganization into Portable Computer, Office Computer, and Advanced Computer divisions—a move designed to keep the firm nimble and responsive to changes in the market, according to Compaq President Rod Canion.

These changes confirm Compaq's intention to become a force in the business computer market. Canion reports that the company's new Dallas-based telecommunications offshoot is already working on a new product. While mum on future products, Canion and several other company officials acknowledge that Compaq's popular 8088-based portable may eventually be enhanced—or replaced—with the Deskpro's 8086 technology. At the present time Compaq has no plans to enter the applications software market.

Meanwhile, the company's growth continues. Compaq's first-quarter earnings for 1984 were \$3.3 million on sales of \$63 million—nearly matching the firm's income for all of 1983. Total 1983 sales exceeded \$111 million, which Compaq claims is a first-year record in American business. Since its formation in 1983, the firm has expanded its payroll from 3 to more than 850.

Currently scattered at six sites throughout sprawling Houston, Compaq has begun construction on a nine-building corporate complex that will house all the company's divisions. Even Compaq's new quality-control program suggests that the firm is now a "major player." Vendors who supply defect-free products are rewarded with continued Compaq business.



Compaq president Rod Canion affirms his company's need to adhere to the PC standard.

Compaq is pouring more of its energies and money into marketing. The Compaq Portable and the Compaq-Plus are already appearing in computer specialty stores throughout Germany, Great Britain, and Canada. The company has also stepped up its domestic marketing efforts, initiating "Compaq in Major Accounts" and "Compaq in Schools" programs. Both incentive programs rely on Compaq's network of 1350 authorized dealers and are administered through the firm's new regional sales offices. Compaq is targeting secondary schools as well as colleges and universities. In the corporate arena the company is offering increased on-site sales, training, and service.

By maintaining near-perfect PC compatibility in the Deskpro product line, Canion has unequivocally cast Compaq's lot with the personal

computer industry's current standard, set by IBM. Fortune magazine recently declared that Compaq's "greatest asset"—PC compatibility—may also be its greatest liability, should IBM opt for a new standard. But Canion is convinced that PC incompatibility is by far the greater risk in today's market.

Canion suggests that the standard has achieved a momentum of its own, saying, "The standard is pervasive, and this, along with marketing considerations, dictates that IBM adhere to it. If a new standard comes out—which only several companies in the industry can really introduce—we will follow that."

As far as Canion is concerned, the new standard isn't likely to be a multiuser operating system, such as AT&T's UNIX. "UNIX is outside the PC marketplace—it is not a force just because the PC can run it. The PC marketplace is a separate, dynamic entity with a life of its own."

State of the Art

"We're concerned about our dealer base," Swavely says. "For them shelf space is the issue. The Deskpro minimizes the number of units a dealer must stock, yet enables [dealers] to support the full product line." Configuring the machine to a buyer's specifications is a quick, simple matter. Indeed, economizing on space may be especially critical now that new Apple and IBM products are jamming dealers' shelves. (See "The Modular Machine.")

The Deskpro line, according to Sparks, "offers a growth path without the threat of obsolescence. With the Deskpro, we actually changed our pricing picture so the whole could equal the sum of the parts—for the end user and the dealer alike." Compaq began shipments of the Deskpro to its highest-volume dealers in late June, and the machines were released in quantity several weeks later.

The Deskpro represents the first product from Compaq's Office Computer Division, but company president Canion confirms that new offerings are on the way from the company's recently formed Advanced Computer Division and Dallas-based telecommunications subsidiary. (See "Room to Grow.")

Releasing a family of desktop computers underscores Compaq's intent to compete with IBM, but the old symbiosis in the Texas upstart's relationship with Big Blue remains. For openers, virtually all Compaq dealers

also carry the PC—and that's the way Canion likes it. "We're armed for an environment that assumes a complete supply of PCs and XTs," he says. "We're assuming that so we aren't identified as a stopgap product."

"Last year we won the battle for shelf space," he continues. "Poor distribution is the error that kills machines every bit as much as design flaws. Now we're making a statement as a long-term company and answering those who ask, 'Can they do it again?'" ●

Ken Greenberg is an Assistant Editor of PC World.

Deskpro

Compaq Computer Corporation

20333 FM 149

Houston, TX 77070

713/370-7040

List price: Model 1 \$2570, Model 2 \$3170, Model 3 \$5170, Model 4 \$7370, MS-DOS 2.00 and BASIC 2.1 (include manuals and disk) \$60, 128K RAM kit \$170, 512K RAM kit \$1295, disk drive option \$430, fixed disk drive upgrade kit (includes controller board and cable) \$2280, fixed disk drive backup \$1075, serial interface/clock board option \$50, 12-inch dual-mode monitor (green or amber display) \$325, monitor tilt and swivel option \$50, Desk Saver \$50

Condor™ made Easy!

HELP! Condor™

MENU DRIVEN CONDOR / ON-LINE HELP SCREENS AND CONDOR TUTORIAL

HELP! Condor was designed with the first time computer user in mind. SoftHelp has enhanced the Condor database to make it more "user friendly."

HELP! Condor is the easy way to enjoy the power of the Condor relational database without learning commands or syntax.

HELP! Condor is both a front-end generic MENU, as well as on-line help for every Condor command. The expert Condor user may alter the source code of HELP! Condor saving days of programming.

The manual for HELP! Condor includes:

- Merging Condor files and Word Processors
- Merging Condor and Lotus 123
- BASIC programs
- Command Files Explained

HELP! Condor™
\$149.00

HELP! Condor by SoftHelp, Inc.

3527 Oak Lawn Ave., Suite 179
Dallas, Texas 75219

(214) 559-3095

VISA / MASTERCARD

"It is one of the most useful programs of its type we have ever seen, and believe me, we see a lot of software."

Don Kenny
Product Evaluation Manager
Micro D
Fountain Valley, CA

"I think this product can make Condor easier to sell, because it makes the users life easier."

Robert Elgier
President
Micro-Age
Houston, TX

"First time Condor users can now be up and going in minutes instead of hours."

Bob Denton
Vice President, Marketing
Seequa Computers

Ferocious FORTRAN.

Microsoft® FORTRAN crunches numbers with a vengeance!

It combines fast and efficient native code compilation with built-in 8087 coprocessor support. The result? Mini and mainframe performance from your MS™ DOS micro.

Based on the '77 standard, Microsoft FORTRAN supports extensive statements and data types—including complex numbers and IEEE single and double-precision floating point accuracy.

Support for large arrays (greater than 64K bytes), separate module compilation, and overlays, allow you to create very large programs—up to one megabyte, with access to more than 65 thousand records in a file as large as four gigabytes.

How do programmers feel about Microsoft FORTRAN?

“The first FORTRAN compiler

that takes advantage of the full addressing capability of the 8088 and the power of the 8087.”

—Jack Wilschke, *Softalk*

“We decided to use the Microsoft FORTRAN Compiler for its INTEGER*4 capability and the flexibility of its 8087 implementation.”

—Charlie Huizena &
Chip Barnaky, *PC World*

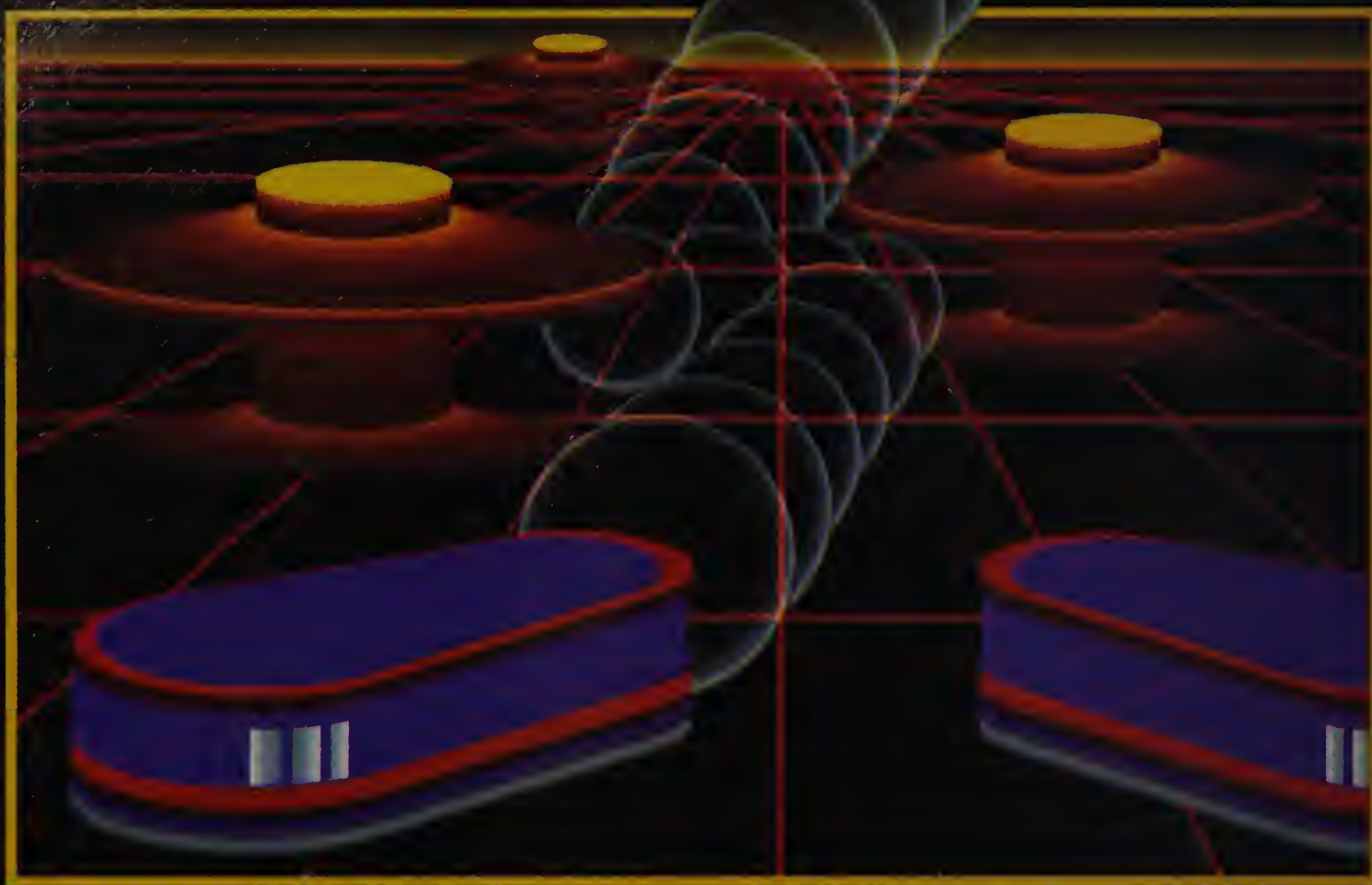
**Call 800-426-9400 to order
the ferocious FORTRAN.
\$350***

In Washington State, call 206-828-8088. Ask for operator C6, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft FORTRAN in action.



TAKE A BREAK!

For IBM-PC
and IBM-XT



WITH NIGHT MISSION PINBALL

You deserve the best. You've earned it. Now reward yourself with a session of **Night Mission PINBALL**, the most realistic and challenging arcade simulation ever conceived! ■ Stunning graphics and dazzling sound effects put **Night Mission PINBALL** in a class by itself. Game features: multi-ball and multi-player capabilities, ten different professionally designed levels of play, and an editor that lets you create *your own* custom modes. ■ So take a break with **Night Mission PINBALL** from SubLOGIC. Winner of *Electronic Games* magazine's 1983 Arcade Award for Best Computer Audio/Visual Effects.



See your dealer . . .

or write or call for more information. For direct orders please add \$1.50 for shipping and specify UPS or first class mail delivery. Illinois residents add 5% sales tax. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

subLOGIC
Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Circle 308 on reader service card

Better Business BASIC.

Finally! A BASIC compiler that means business.

Microsoft® Business BASIC Compiler allows you to create professional applications for MS™DOS systems that are so fast your users will never know they were written in BASIC.

Because the compiler produces native code, your software will run three to ten times faster than the same interpreted programs.

But speed isn't everything. Microsoft's Business BASIC also has business savvy.

MICROSOFT®
The High Performance Software
Based on the de facto standard Microsoft BASIC, it includes a rich set of extensions:

Decimal floating point arithmetic (14-digit precision-BCD format) for extremely accurate dollars and cents calculations.

Two types of arrays provide maximum program flexibility: static arrays for speed, dynamic arrays for expandability.

Over twenty string handling functions provide sophisticated character manipulation capabilities.

Strings can be up to 32K bytes.

Multi-line functions and subprograms allow you to define routines with local or globally defined variables.

Separate module compilation means complex programs can be broken down into smaller units. Coupling multiple modules together permits creation of very large programs, up to one megabyte.

**Call 800-426-9400 to order
the better Business BASIC.
\$600*.**

In Washington State, call 206-828-8088. Ask for operator D6, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft Business BASIC in action.

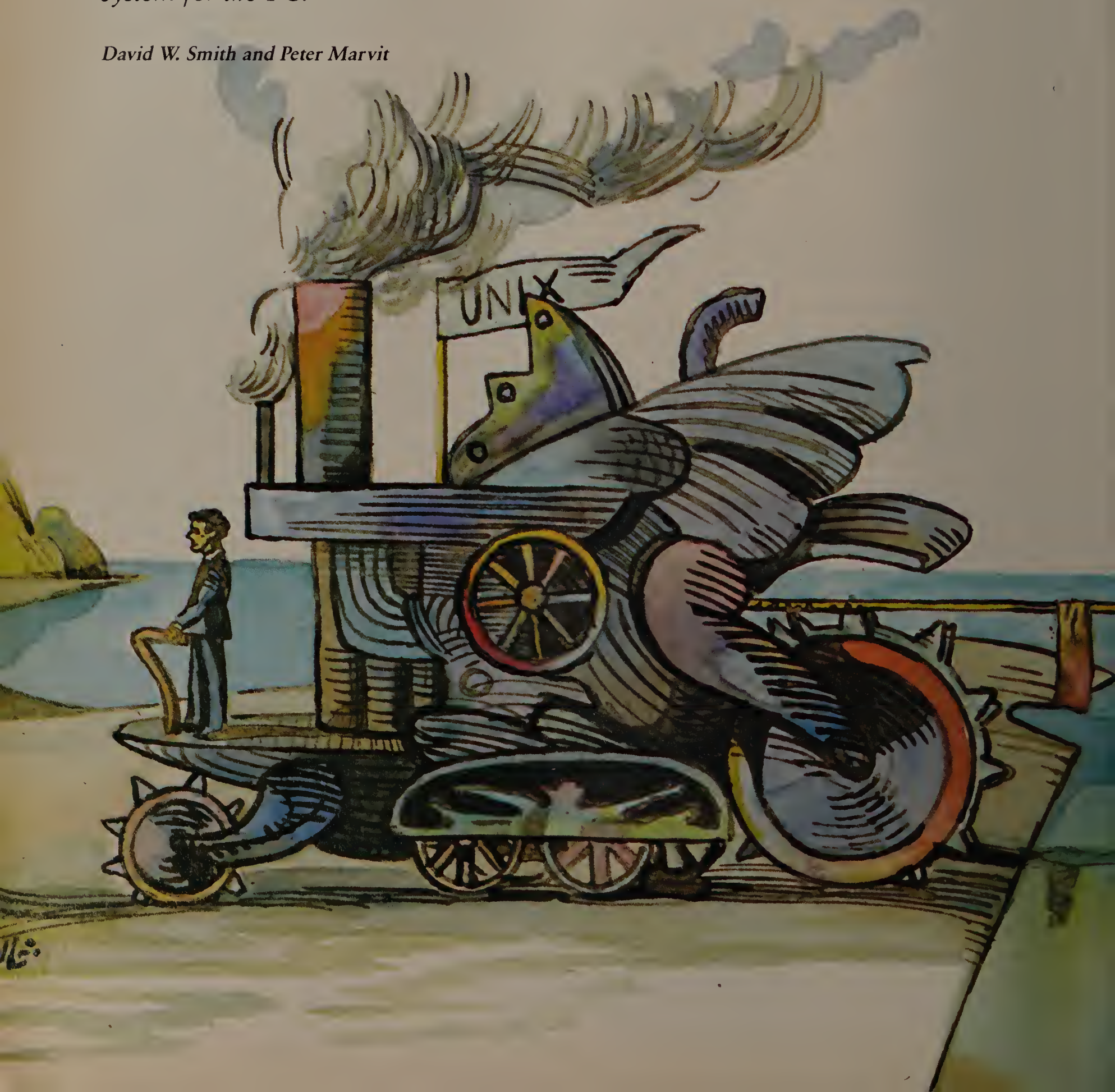


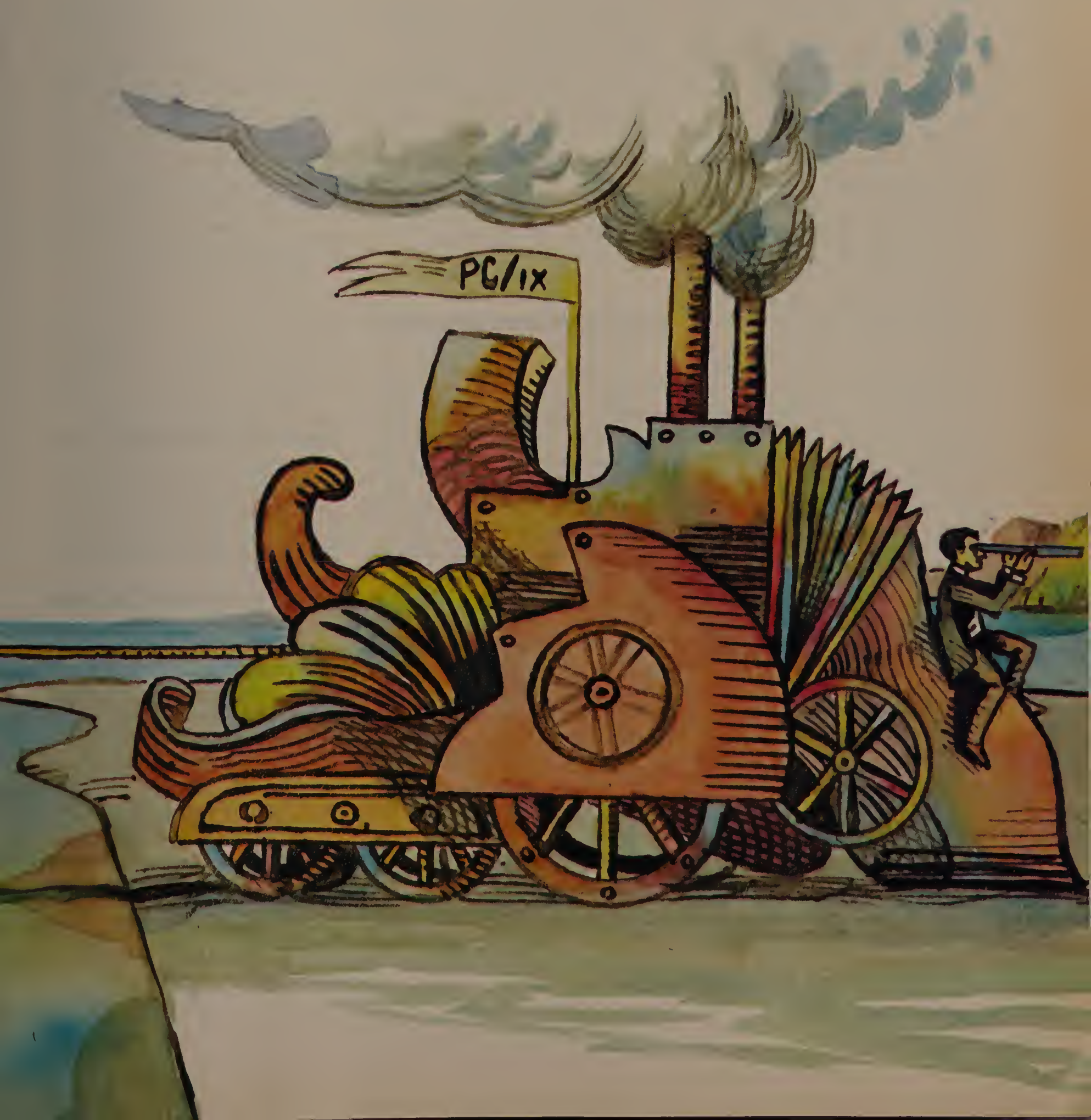
Microsoft
SOFT

UNIX Tug-of-War

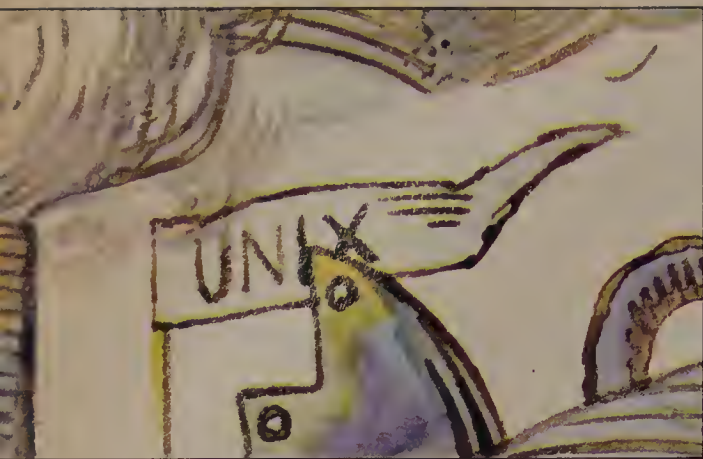
IBM got into the fragmented personal computer business late and ended up dominating the market. But this time IBM is taking on a giant—namely AT&T—with PC/IX, a UNIX operating system for the PC.

David W. Smith and Peter Marvit





● State of the Art



When people talk about UNIX, their voices are tinged with awe as they extol the virtues and complexity of this Bell Labs creation. UNIX is often called the ultimate in operating systems; it is both powerful and portable. Unfortunately, it is also cryptic, which is not surprising, considering that UNIX was developed for large, powerful computers and the programmers who use them.

UNIX is popular with users of large computers because it admirably handles the chore of simultaneously serving a number of users linked to a single machine. For software developers UNIX provides a powerful set of tools that ease the task of programming. A program created in the UNIX environment is not only powerful but works on many machines that support UNIX, including the PC. Though the PC is designed to serve only one user, with PC/IX it can run several tasks simultaneously. Most important, with PC/IX you can use many existing UNIX applications and develop new ones on the PC.

Waiting for PC/IX

PC/IX (Personal Computer Interactive Executive) is derived from Bell Laboratories' System III UNIX and was developed for IBM by Interactive Systems. IBM's inclusion of UNIX in

its official product line puts it squarely in the path of the AT&T juggernaut, which is trying to establish its System V UNIX as the industry standard, and raises a couple of questions. Will PC/IX compete with DOS for a share of the PC pie? Will there be UNIX support for other IBM machines? Many retailers were initially confused after IBM announced PC/IX; one Silicon Valley PC dealer thought that PC/IX ran only on the XT/370.

Now that the smoke has cleared, it's evident that PC/IX is not fighting for the turf held by DOS. It's also clear that PC/IX is not for the masses—it carries a hefty \$900 price tag, requires an XT or a PC with a

PC/IX is not fighting for the turf held by DOS.

hard disk, and will not be available through retail outlets for some time. IBM is targeting Fortune 2000 companies as the PC/IX market through its national sales and marketing divisions.

Even though PC/IX is not competing head-to-head with DOS, it is curious that IBM chose Interactive Systems rather than Microsoft to develop its version of UNIX. Microsoft's XENIX operating system for the PC is based on System III UNIX and would at first glance seem the natural upgrade for an MS-DOS user anxious for UNIX. Many of the enhancements that Microsoft introduced in MS-DOS 2.00, such as the

tree-structured file system and I/O (input/output) redirection, came from XENIX (and thus from UNIX). MS-DOS 2.00 even includes a number of XENIX-compatible system calls.

IBM chooses small companies as suppliers because by doing so it can control product supply and thus the market. Had IBM chosen Microsoft, it would have put two precious eggs—both of the PC's official operating systems—in the same basket. With PC/IX, IBM also enters the UNIX fray with a seasoned product. Since its founding in 1977, Interactive Systems has been involved with UNIX but has kept a relatively low profile. In addition to developing PC/IX, Interactive Systems is rumored to be working on a version of UNIX for IBM's 4300 series mainframes. The question of who will develop a version of UNIX for future PCs—particularly those based on Intel's true multitasking 80286 micro-processor—is still unanswered.

PC/IX

PC/IX is a surprisingly rich implementation of UNIX, and it contains enhancements specifically for the PC. It also includes programs seldom found on personal computers. One of the most important is SCCS (Source Code Control System), a set of programs that maintains an audit trail file of changes made to programs or documents. This historical information serves as a backup to documentation and is particularly useful when a number of programmers work on one project. PC/IX also includes uucp, an electronic mail and communications program that automatically handles file transfers between UNIX systems.

Although PC/IX is a complete and, thankfully, relatively fast UNIX implementation, it lacks some of the "Berkeley enhancements," from UNIX's early days in academia, that

are finding their way into the popular System V UNIX being pushed by AT&T. One big omission in PC/IX is the C-shell, a programmable command interpreter included in most versions of UNIX. Programming DOS's command interpreter, COMMAND.COM, is a two-step process, since you must first write a batch file and then execute it. With a UNIX C-shell, you simply type commands directly into the command interpreter. Aside from this, a seasoned UNIX user won't find much missing in this package. Even a brief hands-on session with a preliminary version of PC/IX confirms that it is a reasonable and credible implementation of UNIX on the PC.

The PC/IX Environment

The only high-level language included with the first release of PC/IX is C. The compiler is based on Bell's Portable C Compiler (the basis of many commercial C compilers) and includes a code optimizer specially crafted by Interactive Systems for the PC's 8088 microprocessor. Also included are an assembler (as), which, like ASM, converts assembly lan-

multiple-window editor called INed. INed will display multiple files or several parts of a file in different windows; thus you can refer to other sections of code while you are in the middle of writing a program, compare two word processing files, or use several applications simultaneously. Menus and help screens are also part of the editor.

Shell commands, such as sort or spell, can also be executed from within INed. For example, you could edit a text file containing a table of unalphabetized names, quickly write the table to disk, and have it sorted and read back into the text without leaving the editor. The same process using DOS and a text editor would involve copying the table into a disk file, exiting the editor, loading a sort utility and creating a new sorted file, loading the editor again, and reading the sorted table into the text—a lengthy, multiple-step process that PC/IX avoids.

Multitasking

Although PC/IX cannot juggle several users at once, it can hold several programs in memory at the same time and execute them concurrently, with the output from one program serving as input for another. This multitasking can be illustrated by constructing a sorted list of all 1977 wines from a text file containing a wine list. When you issue the command `grep 1977 < winelist | sort`, PC/IX uses filters to create the sorted list. Filters in PC/IX, like those in DOS 2.00 and 2.10, read input, alter it, and pass it along to another utility.

The PC/IX command interpreter—also called the shell—reads the command `sort` and invokes `grep`. `Grep` is similar to the DOS `FIND` utility, though it can locate character strings

containing wild cards. The single argument `1977` is then passed to `grep`. The shell arranges for the input to `grep` to come from the file `winelist` and for the output from `grep` to become the input to `sort`. Because no output path was specified for `sort`, the shell directs the output to the screen. At this point `grep` and `sort` are in memory and executing concurrently.

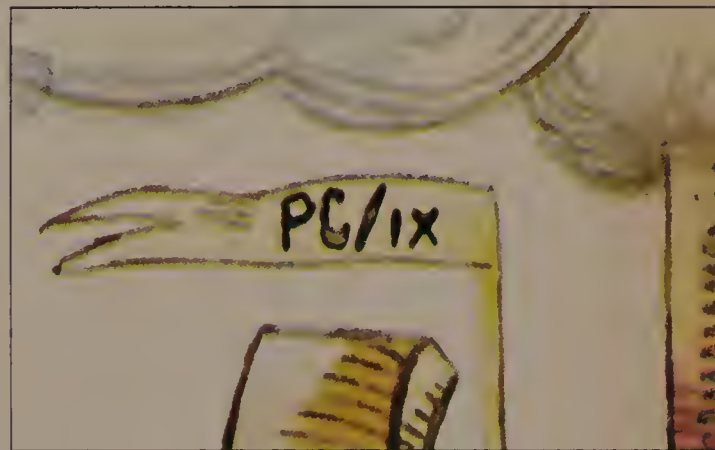
DOS is not a multitasking operating system, and thus only one program can be resident in memory and executing at any given time (something that Microsoft promises to change with MS-DOS 3.00). The DOS command `FIND "1977" < WINELIST | SORT` produces the same results as the PC/IX command above, but it takes longer. Because `FIND` and `SORT` cannot occupy memory at the same time, DOS's command interpreter will break the command into two steps. First the output from `FIND` will be redirected into a temporary disk file, which will serve as input to `SORT`. The entire process is slow and requires additional disk space.

PC/IX's multitasking power also lends itself to local area networks. When a PC XT is a network server, its resources—RAM, a hard disk, and attached peripherals—are dedicated to the PCs in the network. The server cannot normally be used as a work station, but if network soft-

A seasoned UNIX user won't find much missing in PC/IX.

guage mnemonics into object code; a relocating loader (ld), which, like LINK, ties object code modules together; and a symbolic debugger (adb), which reduces the drudgery of debugging by representing object code with symbols.

In addition to the standard UNIX editor, `ed` (which many consider less palatable than `EDLIN` since it has no prompts and responds with cryptic error messages), PC/IX provides a



Feature	PC-DOS 2.00	PC/IX
Single user	Yes	Yes
Multitasking	No	Yes ¹
Password required?	No	Yes
Tree-structured file system	Yes ²	Yes
I/O redirection	Yes	Yes
Printer spooling	Yes	Yes
Line editor	Yes	Yes
Screen editor	No	Yes
BASIC	Yes	No
Compilers	No	Yes
Assembler	No	Yes
Linker	Yes	Yes
Debugger	Yes	Yes
Memory requirements	64K	256K
Drive requirements	1 single-sided disk drive	10MB hard disk and 1 double-sided disk drive
Price	\$60	\$900

¹Disk files are "owned" by a given user and may be protected from being read or written to by other users.

²Pipes are implemented with files.

Table 1: DOS 2.00 and PC/IX features

ware companies take advantage of PC/IX's multitasking abilities, a PC XT could easily satisfy a small network's needs while still functioning as a stand-alone computer.

PC/IX and DOS

PC/IX will happily coexist with other operating systems on the same hard disk, provided that each has separate, dedicated partitions. This ability to share a hard disk with other operating systems is a marketing plus for PC/IX, since it spares hard disk users from forsaking their DOS applications. PC/IX and DOS are particularly good neighbors, since utilities provided with PC/IX transfer data

files between a DOS 2.00 disk or fixed disk partition and the PC/IX file system. Once files are in the PC/IX file system, no file conversion is necessary; PC/IX and DOS are essentially data-compatible. Of course, only one operating system may be active at a time.

When comparing PC/IX and DOS (see Table 1), keep in mind that PC/IX is a complete, ready-to-go development environment. With DOS you are forced to shop for additional software before beginning any serious programming. PC/IX, however, comes with a full-screen editor, a C compiler, an assembler and a linker, and a full set of utilities, including telecommunications programs. The cost of all these extras for DOS would easily exceed PC/IX's \$900 price tag.

Hardware Requirements

PC/IX comes on 19 double-sided disks and occupies 6MB on the 10MB disk, though this can be reduced to about 3MB after nonessential or infrequently used utilities are removed. PC/IX also supports a second hard disk and four single- or double-sided disk drives, plus two serial and two parallel ports. PC/IX requires a minimum of 256K RAM, though IBM recommends at least 512K for a multitasking environment.

PC/IX supports the 8087 numeric coprocessor in a novel and effective way. If an 8087 is not installed in the PC, applications that use floating-

SIMPLICITY



*Integrated software
for decision support
and data processing.*

IT uncomplicates computing. Ease into IT.

The IT series: integrated software that starts with KeepIT, for data base management, and interfaces to other PC-based software and the IT series programs.

The IT series advances the state of the art—to turn your desktop computer

into a complete information center. From AskIT, an intelligent interface to KeepIT. To SwapIT, for memory partitioning and instant windowing.

Simplify things and try IT. You'll like IT.

KeepIT StatIT EditIT
CalcIT LinkIT SortIT
ShowIT PassIT AskIT
WritIT MailIT SwapIT

*For IBM, IBM-compatible,
and MS-DOS microcomputers.*

ITSoftware . . .

ask for IT by name.

*For more information,
call toll-free (800) 222-0592.*

*In New Jersey,
call (609) 799-7500.*

*Or write to us at ITSoftware,
P.O. Box 2392,*

Princeton, New Jersey 08540.

*We'll send you our free
brochure.*

NAME

COMPANY

TITLE

ADDRESS

CITY

STATE

ZIP

PHONE

PCW2

MARTIN MARIETTA

Martin Marietta Data Systems

State of the Art

point calculations are serviced by special floating-point emulation code in PC/IX that is accessed by a special "trap" in the application. If an 8087 is present, PC/IX replaces this trap with an instruction to access the 8087 directly on subsequent executions.

UNIX and the 8088

The PC's 8088 microprocessor can address 1MB of memory, but it cannot effectively manage and protect that memory in a multitasking environment. When several programs are active under PC/IX at once, it is difficult to prevent one from inadvertently writing into memory reserved or "owned" by another. This has two important potential results: the system may crash when an errant program destroys another program or PC/IX, or if a program needs more memory, PC/IX may have to shift other programs next to it in memory to make room—a difficult and time-consuming process. Both of these problems would be alleviated by memory-management hardware, which the 8088, and hence the PC, lacks.

If and when IBM releases an 80286-based machine, memory-management and -protection problems will certainly fade. Many industry observers feel that UNIX in any form requires at least the power of the 80286 to run well on a small machine. Not surprisingly, Digital Research is working with Intel to develop a UNIX System V for the 80286, and Microsoft is working on XENIX-286.

A UNIX in Your Future

Don't expect to walk into a ComputerLand and find a copy of PC/IX—at least not for a while. IBM is not selling the operating system through its national accounts by accident; PC/IX is aimed at those Fortune 2000 corporations that do in-house programming or, like VisiCorp, create software for a living. PC/IX makes the PC more appealing to those who use UNIX on larger systems, because it draws the PC into the development process. A PC using PC/IX can not only run many UNIX applications but develop them as well.

Nevertheless, some UNIX users are taking a "wait-and-see" attitude towards PC/IX, and with good reason. AT&T's System V UNIX is used on many large systems; AT&T has already entered the minicomputer and personal computer markets with a series of 32-bit machines running this version of UNIX. Unless third-party applications arrive soon, PC/IX may have difficulty establishing itself as a small-systems UNIX standard. Though IBM's name on any product is usually a guarantee of success, IBM may yet dance to AT&T's tune. ●

David W. Smith is a software engineer for Tolerant Systems of San Jose, where he works with the UNIX programming environment. Peter Marvit is an industry analyst for Yates Ventures of Los Altos, California, where he follows developments in the UNIX world.

PC/IX

IBM

National Accounts Division
1133 Westchester Ave.
White Plains, NY 10604
914/969-1900

National Marketing Division
4111 Northside Pkwy.
Atlanta, GA 30327
404/238-2000

List price: \$900

Requirements: 256K, one disk drive,
10MB hard disk

OUR AD
#W6



© 1984 by Conroy-LaPointe, Inc. All Rights Reserved

DEALERS
WE BUY
EXCESS
INVENTORIES

PRINTERS AND ACCESSORIES

DOT MATRIX:

	LIST PRICE	OUR PRICE
EPSON, RX80, 100 cps	\$ 399	\$ 299
FX80, 160 cps	\$ 699	\$ 495
FX100, 160 cps	\$ 895	\$ 689
MX100F/T, 80cps, w/Grafix+	\$ 995	\$ 495
Apple II Graphics Dump	\$ 15	\$ 9
MANNESMANN 160L, 80 col. 160cps	\$ 798	\$ 568
TALLY, 180L, 132col. 160cps	\$ 1098	\$ 778
* OKIDATA, 82A, 80 col., 120 cps, para.	\$ 399	\$ 299
83A, 132 col., 120 cps, para.	\$ 349	\$ 319
92, 80 col., 160 cps, para.	\$ 749	\$ 599
93, 136 col., 160 cps, para.	\$ 599	\$ 469
2350P, Pacemark, 350cps, para.	\$ 999	\$ 749
2410P, Pacemark, 350cps, para.	\$ 2695	\$ 2095
ORANGE MICRO, Grappler+, for Apple	\$ 2995	\$ 2395
PRACTICAL, Microbuff In-Line 64K, Para.	\$ 165	\$ 119
Microbuff In-Line 64K, Ser.	\$ 349	\$ 259
QUADRAM, Quadjet, Jet Color Printer	\$ 349	\$ 259
* STAR MIC., Gemini 10"X, 120cps, 2.3K	\$ 499	\$ 289
Gemini 15"X, 120cps, 2.3K	\$ 549	\$ 439

LETTER QUALITY:

AMDEK, 504Q, 40 cps, Para. & Ser.	Call
* TTX, 1014, 13cps, Para & Ser., Pin & Fric.	\$ 649 \$ 399

PRINTER INTERFACES and BUFFERS:

IBM-PC to Epson or Star Micro. Cable	\$ 60	\$ 35
Apple I/F & Cable for Epson or Gemini	\$ 95	\$ 59
QUADRAM, Microfazer, w/Copy, PP, 8K, #MP8 w/PS	\$ 189	\$ 139
Microfazer, w/Copy, PP, 64K, #MP64 w/PS	\$ 319	\$ 239
Microfazer, w/Copy, PP, 128K, w/PS	\$ 465	\$ 345
Microfazer, Snap-on, 8K, PP, Epson w/PS	\$ 179	\$ 145
Microfazer, Snap-on, 64K, PP, Epson w/PS	\$ 319	\$ 235

All Microfazers are expandable (w/copy to 512K) (Snap-on to 64K)

SUPPLIES: Tractor Feed Paper, Ribbons, Daisy Wheels.

MONITORS AND ACCESSORIES

	LIST PRICE	OUR PRICE
* AMDEK, 12" Green, #300G	\$ 200	\$ 125
* 12" Amber, #300A	\$ 210	\$ 149
* 12" Amber, #310A for IBM-PC	\$ 230	\$ 149
* 13" Color I+, Composite	\$ 379	\$ 289
* 13" Color II, RGB, Hi Res, (IBM/Apple)	\$ 529	\$ 439
13", Color IV, RGB, 720Hx400V, (IBM)	\$ 795	\$ 685
DVM III, Color II or III to Apple II I/F	\$ 199	\$ 175
* PRINCETON, RGB Hi Res, HX-12	\$ 795	\$ 499
* RGB Hi Res, SR-12	\$ 799	Call
* Amber, MAX-12 (Mono Brd.)	\$ 249	Call
* QUADRAM, Quadchrome 12" RGBColor	\$ 695	\$ 475
* Quadscreen 17" 968x512	\$ 1995	\$ 1595
ZENITH, 12" Green, Mdl. ZVM123	\$ 200	\$ 99

MODEMS AND ACCESSORIES

	LIST PRICE	OUR PRICE
ANCHOR, Signalman MK I (RS232)	\$ 99	\$ 75
Signalman Mark XII	\$ 399	\$ 269
HAYES, IBM-PC Smartmodem 1200B	\$ 599	\$ 419
IBM-PC Smartcom II Software	\$ 149	\$ 109
Micromodem IIe w/Smartcom	\$ 329	\$ 239
Micromodem 100 (S-100 bus)	\$ 399	\$ 275
Stack Chronograph (RS-232)	\$ 249	\$ 189
Stack Smartmodem 300 (RS-232)	\$ 289	\$ 225
Smartmodem 1200 (RS-232)	\$ 699	\$ 535
IBM-PC to Modem Cable	\$ 39	\$ 29
NOVATION, ACCESS 1-2-3		
(PC1200B + Crosstalk XVI)	\$ 595	\$ 399

DISKETTES

	LIST PRICE	OUR PRICE
AMDEK, 3" Diskettes, Pac-10	\$ 60	\$ 49
CDC, 100 ea SS/DD, 40T (Apple, IBM)	\$ 550	\$ 239
10 ea SS/DD, 40T (Apple, IBM)	\$ 55	\$ 26
100 ea DS/DD, 40T (IBM, H/P)	\$ 750	\$ 295
10 ea DS/DD, 40T (IBM, H/P)	\$ 75	\$ 35
DYSAN, 10 ea DD/SD (Apple, etc.)	\$ 41	\$ 29
10 ea DS/DD 48T (IBM, H/P, etc.)	\$ 69	\$ 43
MAXELL, 10 each, MD1, SS/DD	\$ 55	\$ 29
10 each, MD2, DS/DD	\$ 75	\$ 39
VERBATIM, 10 each MD525-01, SS/DD	\$ 49	\$ 25

GENERIK™ DISKETTES — AS LOW AS \$1

W/jackets, no labels, top quality. 90 day limited warranty by us.

10 ea SS/SD, 35 Track (Apple, Atari)	\$ 42	\$ 17
100 ea SS/SD, 35 Track (Apple, Atari)	\$ 415	\$ 130
1000 ea SS/SD, 35 Track (Apple, Atari)	\$ 4150	\$ 995
10 ea DS/DD, 48TPI (IBM, H/P)	\$ 63	\$ 25
100 ea DS/DD, 48TPI (IBM, H/P)	\$ 626	\$ 170
1000 ea DS/DD, 48TPI (IBM, H/P)	\$ 6260	\$ 1400



GENERIK™
DISKETTES

Each at 1000 quantity.

SS/SD \$1.00 Each
DS/DD \$1.40 Each

SM 1983 by
ComX Corp.

CASH & CARRY OUTLETS:

Over-the-counter sales only. Open Monday through Friday, 10:00 until 6:00, Saturday, 10:00 until 6:00.
PORTLAND, OREGON—NEW LOCATION! At Park 217, Tigard at intersection of 217 and 99W. Coming from Portland on 99W, take immediate left after 217 overpass and Texaco Station. Call 620-5595.
SEATTLE, WASH.—3540 128th Ave. SE, Bellevue, WA 98006 Tel 641-4736, in Loehmann's Plaza near Factoria Square, SE of Hwy 405 & 90 and at SE 38th & Richards.

CONROY-LA POINTEsm

Formerly Computer Exchange

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT!

ALL MAIL: Conroy-LaPointe, Inc. 12060 SW Garden Place, Portland, OR 97223

SHOWROOMS AT: PORTLAND, OR and SEATTLE, WA — BOTH OPEN M-SAT 10-6

256K IBM-PC or XT

320/360K Disk Drives by CDC

90 Day Warranty By Us
Call for Details

Coming soon — products for the PC Jr.

© 1984, Service Mark of Conroy-LaPointe, Inc.

DRIVES AND ACCESSORIES

for the IBM-PC or XT

\$199

FULL HEIGHT

\$209 For One.

Same as now installed by IBM

320K/360K DS/DD DISK DRIVES

With Detailed Installation Instructions

30 Day Limited Warranty by Factory Authorized Distributor

CDC HALF \$189 HEIGHT

320K/360K DS/DD DISK DRIVES

With Detailed Installation Instructions

30 Day Limited Warranty by Factory Authorized Distributor

CDC HALF \$189 HEIGHT

PRINTER COMBO SALE

★ OKIDATA MICROLINE 80



80 cps,
Pin/Triction feed, 80 col.,
132 col. compressed
96ASCII, Graphics, Parallel
List Price \$299, Call for our low price

COMBO A for Apple or IBM — \$549 save \$450

ML80 + dBase II

COMBO B for Apple or IBM — \$494 save \$500

ML80 + WordStar + Mail Merge + SpellStar + Star Index

COMBO C for Apple II + e — \$474 save \$520

ML80 + Appicard (CP/M + 13 Features) + WordStar or InfoStar

COMBO D for IBM-PC — \$397 save \$550

ML80 + 50 Generik™ DS/DD diskettes + Bank Street Writer

+ Home Accountant Plus + 3 Insoft Trux educational games

COMBO E for Apple II + e — \$291 save \$420

ML80 + 50 Generik™ SS/SD diskettes + Bank Street Writer

+ Insoft 3 game pak + Home Accountant

#W6 NATIONAL ORDER DESK

TOLL FREE (800) 547-1289

Order Desk Hours: 6AM to 6PM PST

Oregon TOLL FREE (800) 451-5151

Hot Line For Information On Your Order (503) 620-9878

Portland: 620-9877

FREE GIFT COUPON

Use of our order forms qualifies you for a free gift with your order. Get on our mailing list now for order forms, and our new newsletter and sales specials announcement. Our customers are already on our list.

OUR AD #W6

MAIL TO: 12060 SW Garden Place, Portland, OR 97223

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SUPPLY CENTER for IBM-PC or XT

AMDEK MAI 4-in-1 Multiple Board, Color Graphics, Mono, 128K \$599 \$519

AST Large AST Inventory, CALL

ComboPlus, 256K, S/P/C \$395 \$265

MegaPlus II, 64K, 2S/P/C \$695 \$495

MegaPlus II, 256K, 2S/P/C \$495 \$345

256K MegaPlus II Expander \$795 \$595

SixPakPlus, 64K, S/P/C + S/W \$395 \$295

SixPakPlus, 256K, S/P/C + S/W \$395 \$265

SixPakPlus, 384K, S/P/C + S/W \$695 \$495

For SixPak w/ Game Port, add \$895 \$595

I/O Plus II, S/P/CC \$50 \$39

I/O Plus II, S/P/CC/G \$215 \$150

I/O Plus II, S/P/CC/G \$265 \$185

MonoGraphPlus™ Card (for Lotus) \$315 \$215

PCNet, Starter Kit, PC002 \$1095

PCNet, Circuit Board, PC001 \$495

CCS SuperVision, 132 col., mono. board \$799 \$599

Chalkboard, Power Pad, Req. Kit \$100 \$73

*ComX EconoRAM™ 256K RAM Card w/ Fastrak™ RAM disk

emulator and spooler software. \$495 \$325

CURTIS UNI-I, Monitor tilt & swivel base \$50 \$39

3 to 9 foot keyboard cable \$40 \$30

Verbal CPU "System Stand" \$25 \$19

Monochrome Ext. Cable Pair \$50 \$35

HERCULES Graphics Card, Mono \$499 \$349

Key Tronic KB5150, Std. keyboard \$209 \$159

KB5151, Std. keyboard \$255 \$189

KB5151 jr, keyboard \$255 \$189

Koala Koala Pad™ w/ PC Design \$150 \$109

Programmer's Guide \$15 \$12

MAYNARD Multifunction (6) Card, MFC \$89 \$79

SANDSTAR Memory Card no RAM \$230 \$169

SERIES Memory Card 256K \$499 \$395

HardDisk I/F Module (HDM) \$495 \$399

HardDisk Cable \$30 \$27

Para Port Module (PPM) \$59 \$49

Serial Port Module (SPM) \$95 \$79

Clock Cal. Module (CCM) \$55 \$48

Game Adapter Module (GPM) \$49 \$43

Memory Module "O"K (MMO) \$122 \$102

Memory Module 256K (MM256) \$422 \$357

XT10 meg Hard Disk & I/F \$1395 \$1150

* MICROSOFT SystemCard 256K \$625 \$469

SystemCard 64K \$395 \$295

Mouse \$195 \$145

MOUSE SYSTEMS, PC Mouse w/software \$295 \$195

PLANTRONICS Color Board & Colormagic, 16 color, w/Para \$559 \$395

Color Board & Draftsman, 16 color, w/Para \$559 \$395

QUADRAM * Quadlink NEWEST VERSION \$680 \$485

Quadboard, no RAM, expand to 384K \$295 \$215

Quadboard 64K, expand to 384K \$395 \$279

Quadboard 256K, expand to 384K \$675 \$525

* Quadboard, 384K \$795 \$625

Quadboard II, no RAM, expand to 256K \$295 \$215

Quadboard II, 64K, expand to 256K/2S/CC \$395 \$265

Quadboard II, 256K, 2S/CC \$595 \$395

Quad 512 x 64K plus serial port \$325 \$265

Quad 512 x 256K plus serial port \$550 \$420

Quad 512 x 512K plus serial port \$895 \$625

Quadcolor I, board, 16 colors \$295 \$215

* Quadcolor II, board, use with Quadcolor I \$275 \$199

Quadvue, board, Mono/S/P/CC \$795 \$499

* Quadchrome, 12" RGB Monitor \$1995 \$1595

Quadscreen, 17" 968 x 512 Monitor

MICROSOFT SystemCard 256K \$625 \$469

SystemCard 64K \$395 \$295

Mouse \$195 \$145

MOUSE SYSTEMS, PC Mouse w/software \$295 \$195

PLANTRONICS Color Board & Colormagic, 16 color, w/Para \$559 \$395

Color Board & Draftsman, 16 color, w/Para \$559 \$395

QUADRAM * Quadlink NEWEST VERSION \$680 \$485

Quadboard, no RAM, expand to 384K \$295 \$215

Quadboard 64K, expand to 384K \$395 \$279

Quadboard 256K, expand to 384K \$675 \$525

* Quadboard, 384K \$795 \$625

Quadboard II, no RAM, expand to 256K \$295 \$215

Quadboard II, 64K, expand to 256K/2S/CC \$395 \$265

Quadboard II, 256K, 2S/CC \$595 \$395

Quad 512 x 64K plus serial port \$325 \$265

Quad 512 x 256K plus serial port \$550 \$420

Quad 512 x 512K plus serial port \$895 \$625

Quadcolor I, board, 16 colors \$295 \$215

* Quadcolor II, board, use with Quadcolor I \$275 \$199

Quadvue, board, Mono/S/P/CC \$795 \$499

* Quadchrome, 12" RGB Monitor \$1995 \$1595

Quadscreen, 17" 968 x 512 Monitor

Tecmar Graphics Master \$695 \$545

1st MATE, 64K, S/P/CC \$389 \$275

1st MATE, 256K, S/P/CC \$589 \$399

Captain, 64K, S/P/CC \$424 \$324

Captain, 384K, S/P/CC \$795 \$595

Wave, 256K (short brd.) \$499 \$369

Bosun, S/P/CC (short brd.) \$195 \$145

Titan Accelerator PC (8086 + 128K) \$995 \$750

TG PRODUCTS Joystick \$60 \$40

WICO, IBM-PC Mouse \$100 \$69

SOFTWARE for IBM-PC or XT

BUSINESS & TRAINING

ALPHA, Database Manager II \$295 \$185

ASHTON-TATE Framework avail. July/Aug NEW \$695 \$495

* dBase II, (req. PC-DOS & 128K) \$700 \$375

dBase II User's Guide (Book) \$30 \$20

Everyman's DB Primer (Book) \$15 \$12

The Financial Planner \$700 \$395

Friday \$295 \$199

APPLIED SOFT. TECH., Versaform \$389 \$265

ASK MICRO, GLAR, AP, INV or PR, each \$595 \$295

ATI, Training Programs—Wide line in stock \$700 \$395

* BRODERBUND, Bank Street Writer \$80 \$56

BPI, Gen'l Acctg, ARAP or PR, each \$595 \$395

CDEX, Training for... (Large inventory) \$70 \$47

CHANG LABS, Micro Plan \$495 \$335

* CONTINENTAL, Home Accountant \$150 \$89

Tax Advantage \$70 \$45

FCM (Filing, Cataloging, Mailing) \$125 \$89

Property Management \$495 \$329

DOW JONES, Market Analyzer \$350 \$279

Market Manager \$300 \$239

Market Microscope \$700 \$525

FOX & GELLER, Quickcode, dGraph, Grafox or Oz, each \$295 \$195

dUtil (MSDOS or CP/M-86, each) \$99 \$59

HAYDEN, IBM Pie Writer \$200 \$135

Pie Speller or Sargon III, each \$50 \$34

HOWARD SOFT, Tax Preparer, 1984 for 1983 year \$295 \$220

HUMAN EDGE, Management or Sales, ea. \$250 \$169

IUS, EasyWriter II System \$350 \$259

EasySpeller II \$100 \$68

Business System: GL+AR+AP \$1495 \$995

GLARAP, OC or INV, each \$595 \$395

* INSOFT, Data Design (easy to use DBMS) \$250 \$125

GraFORTH (animated 3D graphics) \$125 \$95

LIFETREE, Volks writer \$285 \$195

* LOTUS, 1-2-3 \$495 \$309

QUE, Using 1-2-3 (Book) \$15 \$12

MICRO LAB, Tax Manager for 1983 \$250 \$169

MICROPRO, WordStar® SPECIAL \$250 \$129

MailMerge™ SPECIAL \$250 \$129

CorrectStar™ NEW SPECIAL \$195 \$125

* WordStar Professional, 4 Pak SPECIAL \$695 \$355

Options Pak, SS/MM/SL SPECIAL \$295 \$155

StarIndex™ SPECIAL \$195 \$109

InfoStar™ SPECIAL \$495 \$259

* MICRORIM, R-base, Series 4000 \$495 \$299

MICROSOFT, Multiplan \$195 \$129

Word \$375 \$259

Word with Mouse \$475 \$325

Financial Statement \$100 \$69

Budget \$150 \$99

BUSINESS & TRAINING

MONOGRAM, Dollars & Sense \$165 \$110

MULTIMATE, Multimate \$495 \$295

* OPEN SYS, GLAR, AP, INV or PQ, each \$695 \$429

* OSBORNE/COMX, (Book & Business, Statistics & Math Programs on DS/DD Disks)

Some Common Basic Programs (70 ea.) \$100 \$69

Practical Basic Programs (40 each) \$100 \$69

PBL, Personal Investor 1.1 \$145 \$99

PEACHTREE, Peach Pak (GLAR&P) \$395 \$239

Peach Text 5000 \$395 \$239

PEARLSOFT, Personal Pearl (DBMS & MIS) \$295 \$195

* PERFECT, Perfect Writer™ \$349 \$219

Writer & Speller, 2 Pak \$399 \$249

Perfect Filer™ or Perfect Calc, each \$249 \$149

Perfect Writer, Speller, Filer, Calc (4) \$699 \$499

SATELLITE, Word Perfect \$495 \$255

SOFTWARE ARTS, TK! Solver \$399 \$299

SOFTWARE PUBLISHING, PFS:File \$140 \$94

PFS:Report \$125 \$84

PFS:Write \$140 \$95

PFS:Graph \$140 \$95

SORCIM, SuperCalc 2 \$295 \$195

SuperCalc 3 \$395 \$265

SSI/SATELLITE, WordPerfect \$495 \$375

Personal WordPerfect \$195 \$149

STC/SOFTEC, The Creator \$300 \$195

STONEWARE, Advanced D.B. Master \$595 \$395

SYNAPSE, File Manager \$100 \$67

SYNERGISTIC, Data Reporter \$250 \$169

T/MAKER, T/Maker III \$275 \$169

VISICORP, VisiCalc IV \$250 \$179

Symphony, avail. July/Aug NEW \$695 \$495

VisiFile or VisiSchedule \$300 \$219

Desktop Plan I \$300 \$219

VisiWord with VisiSpell (128K) \$375 \$269

UTILITY & SYSTEM

1983 CL SOFTWARE AWARD:

"Copy II PC by Central Point Software is still one of the best software buys of available. It will copy more copy protected software and faster than any other backup system. Unlike other copiers it makes an exact duplicate of your original and it does 100% verification of copy. Documentation is excellent!"

* CENTRAL POINT, Copy II PC Backup \$40 \$30

* COMX, Fastrak™, RAM/Disk emulator and printer spooler program. Works on any PC/DOS version or RAMCard. Menu Driven \$100 \$59

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

CHIP & MEMORY SPECIALS

DIAMOND DELIVERS!

The Total Solution
Full Service • Full Support
Low, Low Prices

This Month's Packaged Specials

Wordstar Pro Pack/
Lotus 123

\$689

Wordstar Pro Pack/
Lotus 123/dBase II

\$1039

dBase II/Quickcode

\$569

Wordstar/Mailmerge/
Correctstar/Star Index

\$369

Multimate/Lotus 123

\$619

Microsoft Word/
Mailmerge/Mouse

\$319

Mailmerge/Correctstar/
Star Index

\$189

Easywriter II/Speller II/
Mailer II

\$199

dBase II
Volkswriter Dlx
Supercalc 3

\$call

\$179

\$219

Alpha Software*
APPLE-IBM CONNECTION
DATA BASE MANAGER II

LIST	SALE
\$250	\$139
\$295	\$195

Ashton-Tate*
FRIDAY

\$295	\$189
-------	-------

Condor*
CONDOR 3

\$650	\$349
-------	-------

Continental*
HOME ACCOUNTANT
ULTRAFILE

\$150	\$ 99
\$195	\$125

Microstuf*
CROSSTALK XVI

\$195	\$105
-------	-------

Digital Research*
PASCAL MT + 86
CONCURRENT CP/M 86
C BASIC 86
PERSONAL BASIC
CP/M 86
ACCESS MGR
DISPLAY MGR
DR LOGO
PC DOS LANGUAGES

\$400	\$249
\$350	\$229
\$200	\$135
\$150	\$109
\$ 60	\$ 39
\$400	\$249
\$500	\$329
\$ 95	\$ 69
\$ 95	\$call

Dow Jones*
MARKET ANALYZER
MARKET MANAGER

\$350	\$265
\$300	\$219

Financier*
FINANCIER II
TAX SERIES

\$195	\$119
\$150	\$109

Fox & Geller*
QUICKCODE
GRAFOX
dGRAPH
dUTL

\$295	\$189
\$295	\$199
\$295	\$199
\$ 99	\$ 59

Harvard Software*
HARVARD PROJECT MANAGER

\$395	\$279
-------	-------

Wordstar
Lotus 123
Multimate

Information Unlimited*
EASYSPELLER II
EASYMAILER
GENERAL LEDGER
ACCOUNTS PAYABLE
ACCOUNTS RECEIVABLE
INVENTORY CONTROL
PAYROLL

Lexisoft*
SPELLBINDER

Lifeboat*
LATTICE C COMPILER

Lifetree*
VOLKSWRITER

Micro Data Base*
KNOWLEDGEMAN

Micropro*
MAILMERGE
INFOSTAR
CORRECTSTAR
PLANSTAR
INFOSTAR/STARBURST
STARBURST
SUPERSORT II

Microsoft*
MOUSE
WORD/MAILMERGE
MULTITOOL FINANCIAL
MULTITOOL BUDGET
PASCAL COMPILER
FORTRAN
C COMPILER

Monogram*
DOLLARS & SENSE

Professional Software*
WORD PLUS W/BOSS

\$245
\$call
\$299

LIST SALE

\$100	\$ 59
\$100	\$ 59
\$595	\$299
\$595	\$299
\$595	\$299
\$595	\$299
\$745	\$379

\$495	\$275
-------	-------

\$595	\$319
-------	-------

\$195	\$119
-------	-------

\$500	\$329
-------	-------

\$250	\$135
\$495	\$259
\$195	\$ 99
\$695	\$309
\$595	\$299
\$195	\$ 99
\$200	\$ 99

\$195	\$139
\$375	\$249
\$100	\$ 69
\$150	\$ 99
\$300	\$209
\$350	\$239
\$500	\$349

\$165	\$109
-------	-------

\$495	\$329
-------	-------

R:Base 4000
Multiplan
Symphony

\$329

\$129

\$call

LIST SALE

\$129	\$ 89
-------	-------

Rosesoft*
PROKEY

\$125	\$ 85
\$140	\$ 95
\$140	\$ 95
\$140	\$ 95

Software Publishing*
PFS REPORT
PFS FILE
PFS GRAPH
PFS WRITE

\$295	\$159
\$295	\$159

Sorcim*
SUPERCALC 2
SUPERWRITER

\$425	\$299
-------	-------

Supersoft*
FORTRAN

\$375	\$269
\$250	\$169

Visicorp*
VISIWORD
VISICALC IV

\$395	\$269
\$call	\$call

AST Research*
6 PAK PLUS-64K
ALL OTHER AST PRODUCTS

\$399	\$269
-------	-------

Anchor Automation*
SIGNALMAN MARK XII

\$699	\$499
\$599	\$429

Hayes*
SMARTMODEM 1200
SMARTMODEM 1200B

\$680	\$489
\$295	\$219
\$395	\$269
\$595	\$409
\$395	\$269

Quadram*
QUADLINK
QUADCOLOR
64K EXPANDABLE BOARD
256K
QUADBOARD EXP. TO 384K

\$499	\$355
-------	-------

Hercules*
GRAPHICS CARD

\$ 57

MEMORY CHIPS (64K)

TO ORDER
CALL TOLL-FREE
1-800-227-0545

Software Specialists
For The IBM PC

Diamond Software Supply

484 Lake Park Ave., Suite 123, Oakland, CA 94610

For price quotes, information, or in California call 1-415-893-7676. We credit your order for the call. **Technical Department** (415) 893-7678. International Telex 338139 (attn 149)

IBM is a trademark of International Business Machines

CPM is a trademark of Digital Research

Apple is a trademark of Apple Computer Inc.

- Special Corporate Incentives
- Cumulative/Quantity Discounts
- Same Day Shipment
- Overnight Delivery Available
- Purchase Orders Accepted From Qualified Organizations
- IBM, CPM, Apple formats
- Expert Technical Assistance
- Full Product Guarantees
- Visa, M/C, Amer. Exp.
- Free UPS Surface w/Ppd Check



WHY DEC AND INTEL CHOSE THE MARK WILLIAMS C-COMPILER.

DEC and INTEL wanted the best C technology available, with excellent code density, supporting the full C language and their specific operating environments—all at a competitive price.

They found it all at Mark Williams.

WHY YOU SHOULD CHOOSE THE MARK WILLIAMS C-COMPILER.

Our C-compiler supports the dominant 16-bit microcomputers—68000, PDP-11*, Z8000, 8086—with a proven reliable, high-technology product. We are shipping versions of C for a large number of environments including CP/M* and PC DOS*. Both cross and native compilers are available.

Call us for the distributor nearest you. OEM's should contact us directly about their specific requirements.

Mark Williams Company
1430 West Wrightwood, Chicago, Illinois 60614,
312/472-6659



*PDP-11 is a trademark of Digital Equipment Corporation.

*CP/M is a trademark of Digital Research Corporation.

*PC-DOS is a trademark of IBM.

Compatibles Update

New and notable developments in the world of PC work-alikes

Ken Greenberg

Compatibles Update keeps tabs on the changing and growing market of personal computers that emulate the IBM PC standard. The column features news on hardware and software developments as well as insights into the legal and marketing issues that affect compatibility. *Compatibles Update* also goes behind the headlines and talks to the newsmakers and movers who guide this roller-coaster industry.

Computers

Meet Me at Mitsubishi

Take one venerable American computer maker, add an aggressive new hardware and software company, toss in a Japanese manufacturing conglomerate, stir gently — and out comes one machine sporting two logos.

That's roughly the recipe for the computers manufactured by Sperry Corporation, Leading Edge Products, and Mitsubishi of Japan. Both American concerns subcontracted with Mitsubishi to produce a PC compatible based on Intel's 8088-2 processor chip. Sperry and Leading Edge claim their machines are faster than the PC, offer enhanced color and graphics, can be hooked up to mainframes, and cost less than the PC.

Sperry and Leading Edge agree that their system units are identical down to the ROM. But that's where the similarity ends. The keyboards and monitors differ — and the marketing plans of the two companies diverge decisively. Sperry relied on Key Tronic for its keyboard and Mit-



The Sperry PC (top) and Leading Edge PC share a Mitsubishi system box, but marketing strategies for the machines are worlds apart.

subishi for its monitor. Leading Edge went to a Gulf and Western subsidiary for a keyboard that duplicates the PC's and opted for an N. V. Philips monochrome monitor.

According to Leading Edge VP Geoff Burr, his firm provided the impetus behind the Mitsubishi machine. "We went into the manufacturing marketplace with detailed specifications for a product we wanted built," he said. "We designed it."

But with Sperry handling its own marketing and distribution, you're not apt to see Sperry and Leading Edge computers sharing the same shelf at your local retailer's. Sperry product manager Mike McNulty identified his company's target audience as the "professional PC user" who extends workday applications into the home. Sperry is aiming for Fortune 2000 companies and selected retail outlets, with emphasis on the former.

"Sperry has a systems solution approach," McNulty said. "The Sperry PC can be hooked up to anybody's mainframe — hopefully Sperry's. We feel we're extending the power of the data processing world to the desk top."

Sperry's strategy is to use its PC to secure its mainframe base and thus counter the practice of hooking up IBM PCs to Sperry mainframes. By becoming more visible on desk tops, the Sperry PC will remind users of the company's installed mainframes — or so Sperry hopes.

As a sales incentive Sperry recently began bundling its computer with Fox & Geller software, including three *dBASE II* enhancement programs—*Quickcode*, *dUTIL*, and *dGRAPH*—plus *Grafox*, a menu-driven graphics program, and *OZ: Management Control*, a financial management program.

Leading Edge's Burr put it bluntly: "We're looking at totally different marketplaces," he said. "Leading Edge is marketing to 6000 computer retail specialty stores, plus small- and medium-size systems and software houses."

One thing both firms share is an inauspicious product debut. Both had to cope with a potentially defective power supply in early shipments from Mitsubishi. In February Leading Edge recalled its first 1170 units, while Sperry—which had relatively few machines in user's hands—dispatched field engineers, primarily to demonstration sites and corporate users. Burr reported that 100 percent of the Leading Edge units were repaired within weeks of the recall.

Tabor to produce the portable Seequa 325. The number 325 refers to the computer's dual Tabor 3.25-inch drives, capable of storing 360K each. The Seequa is the first machine so equipped. The 325 features dual 8088 and Z80 processors, 128K of RAM, a PC-style keyboard, a 9-inch green phosphor monitor, color and black-and-white graphics capabilities, and serial and parallel ports.

Seequa hasn't forgotten software for these unconventional microfloppy drives. Included for the computer's \$2495 list price are MS-DOS 2.00,

Small, smaller, smallest: the 3¼-inch microfloppy disk (far left) is challenging 3½-inch and 5¼-inch floppies for status as a standard.



While neither company admits the existence of a marketing agreement, Burr said there is a pact governing production and that Leading Edge is currently entitled to a "considerably" higher percentage of units produced. "We're not really competing. Our pricing is lower, our margins are lower—and to meet demand, we will need a lot more units than we first thought."

The Medium Is the Message

With Sony, Apple, and Hewlett-Packard going to bat for 3½-inch disk drives, it's no surprise to see this alternative to the 5¼-inch standard becoming popular with users and manufacturers. But an even smaller upstart may give the 3½ a bit of a tussle.

Seequa Computer, manufacturer of the inexpensive Chameleon compatible, has joined forces with Dysan and

Perfect Writer, Perfect Calc, Perfect Speller, GW BASIC, and C-Term.

Also available are such standards as *WordStar*, *Multiplan*, and *SuperCalc*.

Unlike 3½-inch disks, which are encased in a hard plastic sleeve, 3¼-inch disks, like their 5½-inch and 8-inch brethren, are flexible. Dysan officials claim that the 3¼-inch disks are compatible with the standard 5¼-inch disk data format. Data can be copied onto a 3¼-inch disk by plug-

ging both drives into the same machine—something you can't do with 3½-inch disks, Dysan contends. A Seequa spokesperson said the move to 3¼-inch drives was made because of their "reliability and compactness. . . . We believe these drives represent state-of-the-art technology," he said. "They offer greater portability and protection from contamination" than the current standard.

One industry source suggested Tabor and Dysan were interested in introducing the new disk drives immediately, amid the confusion produced by several conflicting technologies for the 3½-inch drive. The firms are betting that the introduction of a single 3¼-inch drive—produced domestically—will eventually lure the industry to coalesce around that standard.

Zenith Adds Five Compatibles

Claiming that its new machines "go beyond" IBM PC compatibility, Zenith Data Systems has begun marketing five personal computers: three Z-150 desktops and two Z-160 portables, sporting different disk drive configurations. All feature Intel's 8088 microprocessor, 128K of RAM expandable to 640K, two RS-232C serial ports, one Centronics-compatible parallel port, RGBI color output, composite monochrome output, an IBM expansion bus with four slots, and a detachable keyboard. All machines come with a tutorial audio tape.

The desktop models come in three disk drive configurations: a single half-height 5¼-inch floppy drive,



Zenith's Z-160 PC compatible portable features a unique top-loading floppy disk drive housing.

dual half-height 5¼-inch floppy drives, and a system with one half-height floppy drive and a 10.6MB hard disk. The portable comes with either one or two half-height floppy disk drives mounted within a hinged box that occupies the rear three-quarters of the top of the portable. The box flips up when the machine is in use. Both portables weigh 30 pounds and include 9-inch amber monitors. Monitors are not standard equipment for the desktop models. The portables cost \$200 more than the desktops.

To bolster its claim of hardware and software compatibility, Zenith has reported testing "dozens" of PC expansion boards and more than 175 software programs written for the PC, including *1-2-3* and *Flight Simulator*. "We ran them right out of the box without any modification," says Zenith Data Systems president Donald Moffet. Zenith marketing vice president John Frank explained that the company is seeking to surpass the IBM standard by offering features not found on the PC or most compatibles.

Among those features is a redesigned keyboard that boasts an enlarged, L-shaped <Enter> key, a double-width <Shift> key, and English-language key legends; the keyboard remains functionally identical to the PC's, however. Built-in, menu-driven diagnostic software greets you when you turn the machine on. The automatic-boot feature enables you to start an operating system from any disk. Zenith also touts its three scrolling modes (basic, smooth, and jump), high-speed graphics display, monitor/debugger in ROM, and text display reputed to be twice as fast as the PC's. The Z-150 desktop model takes up 20 percent less desk space than the PC.

The 150 Series is also available in kit form from Zenith's Heath subsidiary. Hobbyists consulting the latest Heath catalog will find the Zenith desktop billed as the HS-151 and the portable as the HS-161. Both models have four expansion slots.

No sooner had Zenith released its new line than BPI Systems licensed Zenith to market 17 BPI software products. Among the programs ready for the Z-150 and Z-160 are BPI's *General Accounting*, *Accounts Payable*, *Accounts Receivable*, *Payroll*, *Inventory Control*, *Business Analyst*, *Personal Accounting*, and *Personal Investing*.

For further information contact Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025, 312/391-8744.

Logical Update

Logical Business Machines has announced enhancements to its LX-T, a PC XT compatible. At the November 1983 COMDEX, *PC World* tested an LX-T with a monochrome TTL monitor and reported that Microsoft's *Flight Simulator* did not run on the computer—a result that Logical does not dispute. The company claims that the machine now runs the program if an RGB monitor is attached or with a composite monochrome monitor if the machine is in the composite mode.

Based on its ongoing software tests, Logical reports that the LX-T can execute some, but not all, of the commands in programs such as *Friday!*, *1-2-3*, *Frogger*, *Night Mission*, *Four Point*, and *AutoCAD*. The LX-T is bundled with *Microsoft Word* and *Microsoft Plan*, MS-DOS 2.11, and *Diplomat*, Logical's natural language. Maximum RAM on the motherboard is 256K; disk capacity is 360K.



Sanyo's MBC 550 series offers PC compatibility for those on a budget.

Bargain Basement

Sanyo Electronics, the folks who bring you affordable transistor radios and TVs, is marketing what may be the least expensive of the PC compatibles. Called the MBC 550, the Sanyo computer lists for \$999. That buys an 8088-based machine with one half-height, single-sided, 5¼-inch floppy disk drive, 128K RAM expandable to 256K, high-resolution color graphics capabilities, and a parallel port. A monitor and an RS-232C port are optional. Another model, the MBC 555, includes two half-height, single-sided drives. The purchase price also includes Sanyo's own Graphics BASIC, MS-DOS 1.25, *EasyWriter I*, *WordStar*, and *CalcStar*.

The MBC 550 may be the Cabbage Patch Doll of the microcomputer realm, however, if reports of distribution delays are accurate. Los Angeles retailer Russell Wyluda, whose Personal Computer Services shop carries the Sanyo line, was

down to his last two units when contacted by *PC World*. Wyluda said that virtually no Southern California store had the Sanyo machine in stock. "Lots of places advertise, but the best they'll do is put your name on a list," he said. Sanyo may resolve its own supply problems, now that Intel has licensed the firm to produce 8088s for the MBC 550 and 555. Wyluda reported that a new, more compatible, more expensive Sanyo machine may also be on the way.

For further information contact Sanyo Business Systems Corporation, 51 Joseph St., Moonachie, NJ 07074, 201/440-9300.

Business

It Was a Very Good Year

Completing its first year of business, Compaq Computer Corporation is pointing to Texas-size success. The Houston-based manufacturer of PC-compatible portables recorded 1983 sales of \$111 million, a feat that Compaq claims makes it the most successful new company in American history—and second only to IBM in sales of 16-bit computers. (Shortly after Big Blue announced its portable, Compaq dropped the list price of its single-drive system from \$2995 to \$2495 and its dual-drive system from \$3595 to \$2995.)

So what do you do with such resounding success? You break ground for a new corporate headquarters. And in Houston, that means 187,000 square feet. Room for lots of portables.

While not quite duplicating Compaq's achievement, Columbia Data Products enjoyed a healthy 1983, reporting record sales and income for the year. Columbia sold more than \$56 million worth of desktop and portable PC compatibles, a sixfold increase over 1982's performance. Net income in 1983 exceeded \$3.6 million, compared to \$269,000 in the previous year, and shipments soared from 1200 units in 1982 to 24,100 by the close of 1983. The company went public in January.

Like Compaq's, Columbia's success is the construction industry's gain. The company recently added 35,000 square feet to its Maryland manufacturing plant. Columbia has also embarked on an ambitious dealer incentive program, backed by an extensive ad campaign in local newspapers. The tag line: "The more you think IBM, the more you like Columbia."

Elsewhere on the sales front, getting MAD may mean getting rich. MAD (Modular Advanced Design) Computer, maker of the MAD-1 microcomputer, recorded more than \$9 million in sales during its second month of production. More than \$6 million of that total is the result of MAD's two-year distribution agreement with The Computer Station, a retailer based in Vancouver, British Columbia. The MAD-1 features a 16-bit 80186 microprocessor and a sleek, modular design.

Software

Tandy 2000's Growing Software Base

A number of popular programs are now available for the Tandy TRS-80 Model 2000, an 80186-based MS-DOS compatible from Radio Shack. Among the software packages recently modified for the 2000 are MicroPro's *WordStar* and Lotus Development's *1-2-3*.

Through its Express Order Software program, Tandy is offering the complete *WordStar* package, which includes *CorrectStar*, *MailMerge*, *StarIndex*, and a tutorial. *WordStar* works with the full line of Radio Shack printers. Shipments of *1-2-3* to the more than 1000 Radio Shack Computer Centers nationwide were slated to begin last month, according to Lotus Development president Mitch Kapor.

Also available for the Tandy 2000 are *FinalWord*, from Mark of the Unicorn, and Pyramid Data's *Number Cruncher* series of business software products. *FinalWord* is designed for handling lengthy documents (such as novels) and features a window management system and automatic formatting options. Pyramid's *Number Cruncher* applications include spreadsheet, report generation, and relational data base management. Versions of *Number Cruncher* are also available for the DEC Rainbow, the Eagle Spirit portable, and Eagle XL desktop compatibles.

Corona Gives Framework a Spin

How PC-compatible is Corona Data Systems's portable computer? Compatible enough to run a hefty new integrated package designed for the PC, Corona is crowing. Ashton-Tate is relying on 75 Corona portables for its nationwide *Framework* demonstration tour.



Corona's portables, which deliver high-resolution graphics, are taking *Framework* on tour.

Framework, Ashton-Tate's entry in the integrated software sweepstakes, combines word processing, spreadsheet functions, business graphics, data management, forms processing, an outline generator, and concurrent access to other MS-DOS software. It also includes a procedural language known as "Fred."

Spreading the Processed Word

If it's true that software sells hardware, the folks at Texas Instruments ought to be feeling good about their TI Professional Computer, which continues to receive software support. The latest additions to the TI library include *EasyWriter II* and *Select: The Word Processor*.

The *EasyWriter II* system incorporates components previously marketed as *EasySpeller II* and *Easy-Mailer II* and integrates word processing, spelling checker, and mail-merge functions. *Select: The Word Processor* for the TI Professional is functionally identical to its IBM PC counterpart. The program features key files, punctuation positioning, an expandable spelling checker, and a mail-merge function. At the same time Select introduced a separate MS-DOS version of the product for the Victor 9000.

For additional information on compatibles cited in this column, please consult "The Compatibles Line Up," PCW, Vol. 2, No. 4.

Compatibles Update welcomes contributions from readers, and we'll pay up to \$50 for the items we use. Please include your name, address, and phone number with your contributions. Send them to Compatibles Update, PC World, 555 De Haro St., San Francisco, CA 94107. ●

Look Again.

DASHER™
D400
D200
D100

DEC™
VT100
VT102
VT52

**I'M YOUR NEW
DEC OR DASHER
CRT!
(and more!)**

**NOW
TRUE 132
COLUMN VT100™
DISPLAY!***

SMARTERM™ DOES IT!

You may have just bought your last DEC™ or DASHER™ terminal. Now, with our **SMARTERM** software you can turn an ordinary IBM® PC into a **D100**, **D200** or **D400** terminal. Or, choose **VT100**, **VT102** or **VT52** capability. And, what's more, you get powerful ASCII and binary **file transfer**, including an "error-free" mode.

SMARTERM features include full keyboard emulation, multiple setup configurations, "smart" **softkeys and command files**, 75 to 9600 baud operation, online help screens and full **printer support**.

With each order you'll get a complete user manual, reference card and key-top chart.

Hard to believe? Try It!

If you're not satisfied, return it within 30 days for a full refund. **Call us NOW** for more information.

Available through your local software dealer or directly from:

**Persoft
Inc.**

2740 Ski Lane
Madison, WI 53713
(608) 273-6000
TELEX 759491

Ask About
Versions For
PCjr.

Software for Professionals . . . by Professionals.

*On your monochrome monitor using the new SuperVision™ board! Ask about our special board prices, as well as other 132 column board support.

SMARTERM is a trademark of Persoft, Inc. • DEC and VT are trademarks of Digital Equipment Corp. • Dasher is a trademark of Data General Corp. • IBM is a trademark of International Business Machines, Inc. • SuperVision is a trademark of California Computer Systems, Inc.

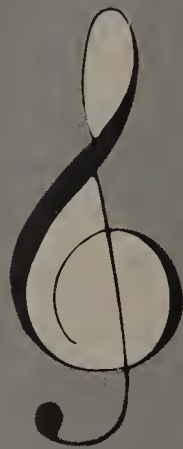
Circle 142 on reader service card

Calling Micro Mart Can Be Music To Your Ears

Micro Mart is more than mail order. We are a multi-million dollar production, orchestrating your favorite PC hardware and software at superb discounts—all accompanied by great service and technical support.

Find out what our biggest critics (our Fortune 500 accounts) already know. Our selection is above measure. Each of our consultants are virtuosos in personal productivity and our discount savings will tickle your ivories.

We're playing your tune in the heart of distribution, not just fiddling about "the Old Mill Stream." So check out the score of state-of-the-art PC products in the rear of this magazine and give us a ring. Ask for expert advice and your best price.



Also Appearing Daily In:

Atlanta • Charlotte
Washington DC • Tampa
Louisville • Showrooms

Coming Soon To:
Ft. Lauderdale • Orlando
New Orleans

Micro Mart Computer Centers
See our 2-Page Ad in Rear of Magazine

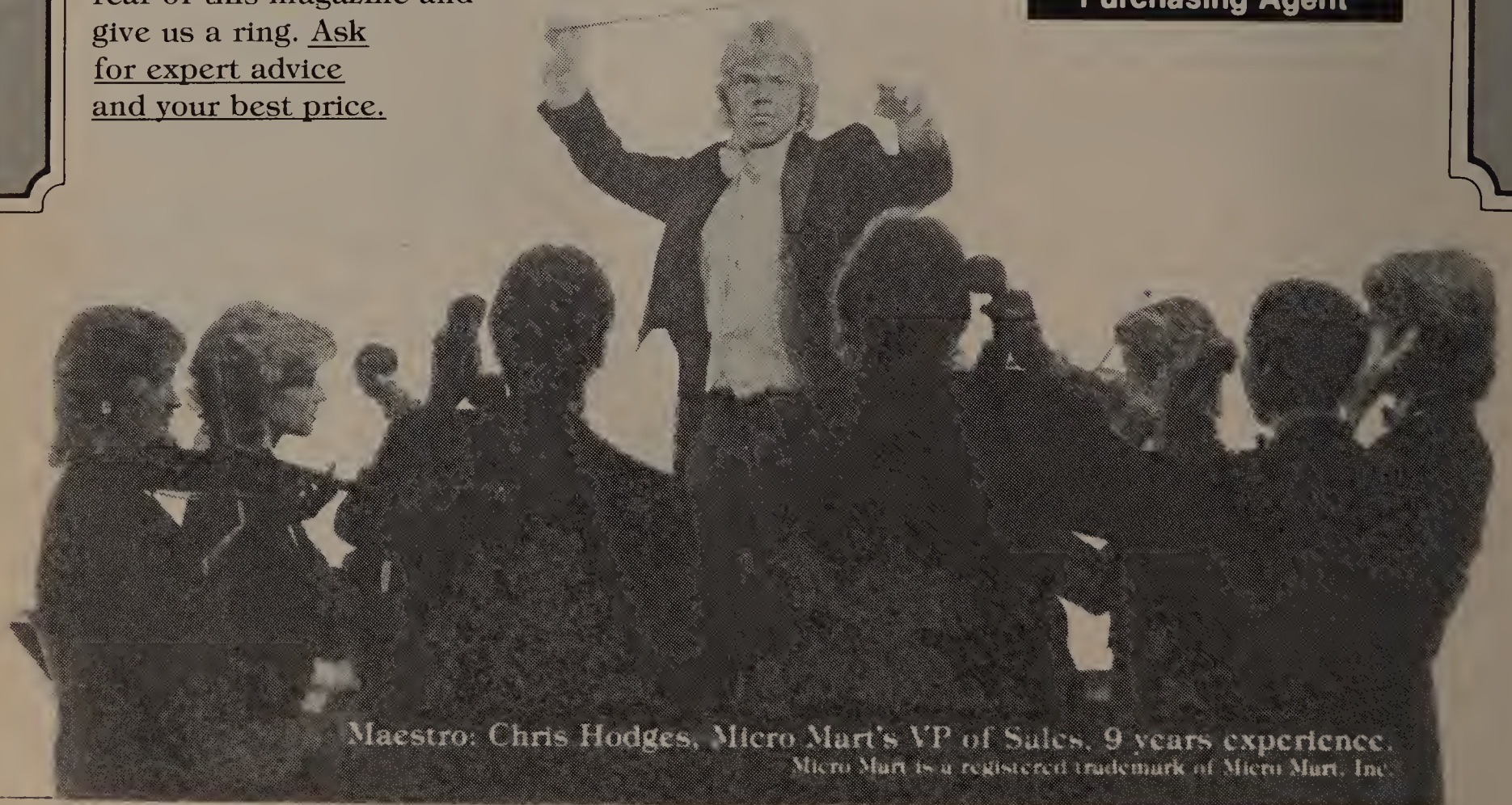
America's PC Specialists

MICRO MART™

Technology Corporate Campus
3159 Campus Drive • Norcross, GA 30071

Orders Only 1-800-241-8149
For Information 1-404-449-8089

**Show Our Ads To Your
Purchasing Agent**



Maestro: Chris Hodges, Micro Mart's VP of Sales, 9 years experience.
Micro Mart is a registered trademark of Micro Mart, Inc.

SEEQUA SHOWS YOU HOW TO GET AN IBM® PC FOR JUST \$1995.

BUY A CHAMELEON BY SEEQUA.



The Chameleon by Seequa does everything an IBM PC does. For about \$2000 less than an IBM.

The Chameleon lets you run popular IBM software like Lotus® 1-2-3™ and dBase II.® It has a full 83 key keyboard just like an IBM. A disk drive like the IBM. And a bright 80 × 25 character screen just like an IBM.

But it's not just the Chameleon's similarities to the IBM that should interest you. Its advantages should, too. The Chameleon also has

an 8 bit micro-processor that lets you run any of the thousands of CP/M-80® programs available. It comes complete with two of the best programs around, Perfect Writer™ and Perfect Calc.™ It's portable. And you can plug it in and start computing the moment you unwrap it.

So if you've been interested in an IBM personal computer, now you know where you can get one for \$1995. Wherever they sell Chameleons.

The Chameleon by



SEEQUA
COMPUTER
CORPORATION

8305 Telegraph Road
Odenton, MD 21113

Chameleon shown with optional second disk drive.

To learn more about Seequa or for the location of the Seequa dealer nearest you, call (800) 638-6066 or (301) 672-3600.

IBM is a registered trademark of International Business Machines Corporation.



StorageMasterTM Media is Here!

Now you can buy flexible disks with a five year warranty from Control Data.

A lot of companies make diskettes. But Control Data also makes disk drives. In fact, we're the leading independent supplier of disk drives to computer manufacturers.

Now we've put our expertise into a truly superior line: StorageMaster diskettes from Control Data.

You can choose from a com-

plete line of premium 8" and 5.25" diskettes in single or double densities, single or double-sided. And each diskette is 100% certified and backed by a 5 year warranty. So you can depend on them to perform for years to come.

Look for StorageMaster diskettes at your local computer store or ask for them from your computer supplies distributor.

Or give us a call toll-free at 1-800/328-6207 (in Minnesota call 612/853-8065) and we'll tell you where to find StorageMaster diskettes.

CD
CONTROL
DATA

Circle 646 on reader service card

**When you're last
to the party,
you better bring**

something special. Like a 10 Megabyte Winchester for \$888.

You could safely say we are just about last to the Winchester add-on party. For two years we have searched for the right components at the right price. Anybody can buy controllers and drives, make up a name, and presto, they are in the hard disk business. But to do it right, takes much more than just bundling the nearest components.

Anybody Want a V-8?

Adding a hard disk to an IBM PC can be very much like stuffing a V-8 engine in the back seat of your VW bug. There is room to put it there, and you will have one fast beetle—but you create a whole new set of problems. Like excessive power drain which results in heat.

Cool & In Control

Qubie' has attacked the power/heat problem with a state of the art controller and drive that draw less power than any on the market today. Start with our controller. It is three times faster than the controller in the IBM PC/XT. The controller uses LSI (Large Scale Integration) technology to lower the number of components on the board. Fewer components require less power. Less power means less heat. More power left for other expansion boards, and lower operating temperatures inside your PC. Don't forget our

low power drive. It draws the same amount of power as a floppy disk, and is the lowest power consuming drive on the market today.

Sitting Or Standing

Since PC's seem to be getting more and more portable we decided we selected a drive that can be used in the desktop or portable PC. Our drive uses plated media. Plated media can stand up to the rigors of the real world. Special design of the drive allows it to operate at any angle. No need to treat your PC like a piece of antique china just because you have added a hard disk.

Complete Package

Included in the package is everything you need to install it yourself. A 10mb Winchester drive, controller, cables, mounting hardware, and step by step instructions to explain the installation. You can use PC-DOS version 2.0 or 2.1 without any modifications.

Why Buy From Us

Because besides having the best hard disk system on the market, we stand behind it and you. You get direct technical support after the sale. If at any time during the one year warranty period your system should require service, we will fix it or replace it within 48 hours.

Notice there are no hidden charges in our

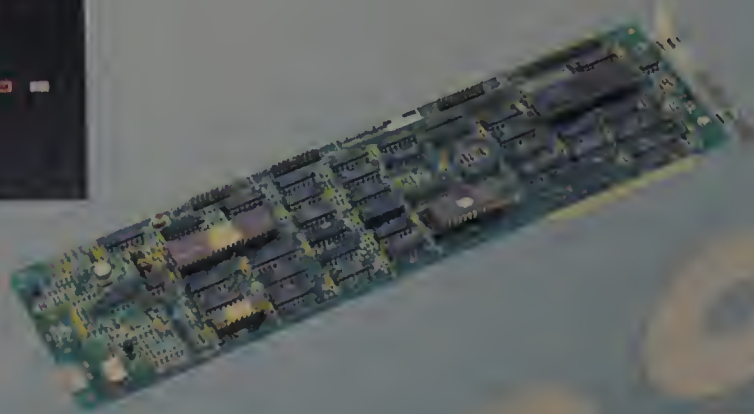
price. No extra for freight, credit cards, COD fees, or insurance. If you still are not convinced, and are ready to buy another brand of hard disk, ask them if they will take our acid test.

The Acid Test

Qubie' gives you a 30 day satisfaction guarantee on our hard disk system. If for any reason you are not satisfied with your purchase, you may return it for a complete refund including the postage to return it. If you can, get any of our competitors to give you the same guarantee. Buy both and return the one you don't like. We know which one you will keep.

**Qubie' PC10 with 10 Megabyte
hard disk, controller, cables,
installation hardware, and
Instructions. 1 Year Warranty.
\$888**

IBM is a trademark of International Business Machines Corporation



**Plated Media for
Rugged Performance**

Order Today, Shipped Tomorrow!

All prices include UPS surface freight and insurance. Add \$12 for two day air service. For fastest delivery send certified check or credit card. Personal checks take 18 days to clear. Calif. residents add 6% sales tax. Corporations and Institutions call for purchase order details.

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
Camarillo, Ca. 93010

Tempo House, 15 Falcon Road,
London SW11 2PH, United Kingdom



What if your PC suddenly became faster, smarter and easier to use?

You're going to be hearing a lot about our new productivity software, Framework™. You'll see business magazine ads and even TV commercials. But those aren't for you. They're directed at the first time PC buyers.

Right here is where you'll get the inside story on Framework.

Framework introduces a new generation of software. It's the logical step beyond spreadsheet-based integrated software like 1-2-3™.

Framework is for thinkers. It's an idea processor that's equally comfortable with words and numbers. Novices can learn Framework's unique outlining feature, word processing, spreadsheet, graphics, and database in a matter of hours. But what's really in Framework for you?

You can run PC DOS compatible programs like dBASE II® or 1-2-3 within Framework. You can write macros easier and faster than ever.

Framework has a full applications language named Fred™, which is going to make it the hottest ticket for third-party developers since dBASE II.

And you can ignore all of Framework's friendly menus and HELP features for beginners, because Framework works even better and faster with power commands.

The more you know about software, the more amazed you're going to be when you see Framework.

ASHTON-TATE™



Framework. For Thinkers.™

FOX & GELLER

ANNOUNCE

THE ONLY THREE

FOR

dBASE III™

They've done it again! As proof of their never ending commitment to dBASE users, Fox & Geller are proud to announce a new line of innovative enhancement packages designed exclusively for Ashton-Tate's new dBASE III.

QUICKCODE III™

To handle the immense size and power of dBASE III Fox & Geller have developed QUICKCODE III. This greatly expanded program generator allows you to create programs without having to go through the tedious chore of writing code. You save time and gain instant access to a variety of powerful programs most commonly required by database users.

dGRAPH III™

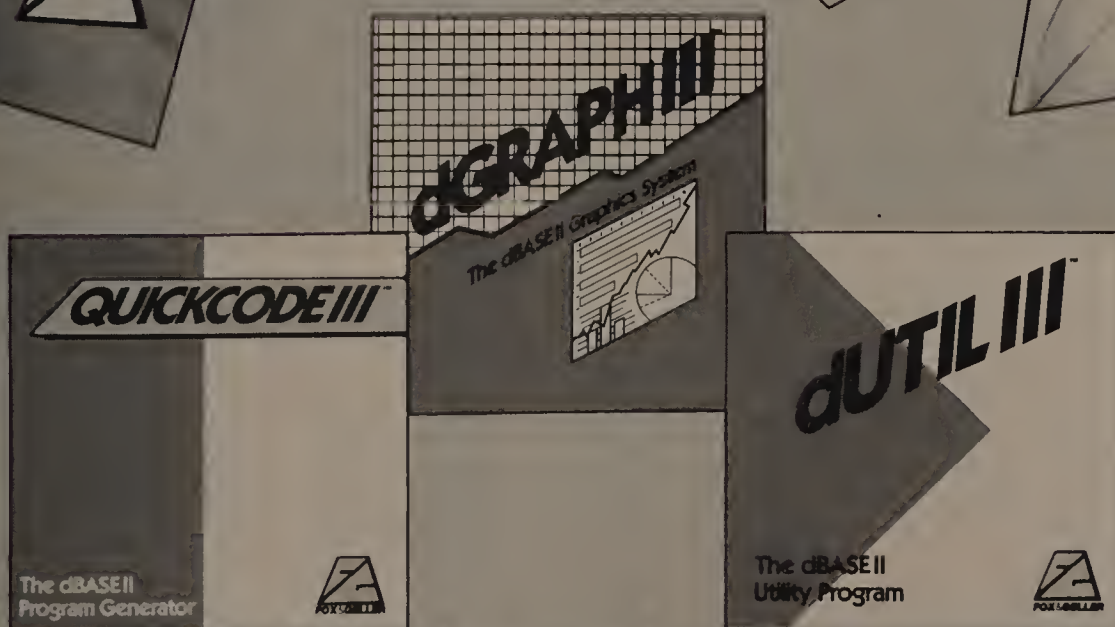
dGRAPH III is the new graphics package for dBASE III that transforms your data into brilliant color graphs, instantly! dGRAPH III will select, sort, average and total dBASE III datafiles, and then display them in bar, pie, pie-bar and line graphs. You get full color, presentation quality graphs, with a few simple keystrokes.

dUTIL III™

dUTIL III is the new dBASE III utility program which will save you time and effort, greatly improving your database productivity. dUTIL III simplifies writing instructions and aids the user in debugging dBASE III command files.

Only Fox & Geller could create a series of product enhancers that enable the user to take full advantage of dBASE III's heightened speed and increased capability. If you own dBASE III or ever plan to, get to know Fox & Geller and their innovative line of dBASE III enhancers.

THE ONLY THREE FOR dBASE III.



Ask your local computer dealer for more information about Fox & Geller products, or call Fox & Geller directly at 1(800)221-0156.

FOX & GELLER

Fox & Geller, Inc. 604 Market Street, Elmwood Park, N.J. 07407 Fox & Geller, U.K. 17 Wigmore Street, London W1, England 011 441-580-5816
Fox & Geller Ltd. Amsterdamsestraatweg 23, 1411 AW Naarden, The Netherlands 011-31-2159-47170

dBase III is a Trademark of Ashton-Tate Quickcode III, dGraph III, dUtil III are Trademarks of Fox & Geller © 1984 Fox & Geller

Circle 71 on reader service card

Summertime,

SOFTWARE

Alpha Software

Database Manager II	call
Apple-IBM Connection	call
Type Faces	call

ApTec (for color Prism Printers)

Rainbow Writer Color Text Formatter	\$119.
Rainbow Writer Screen Grabber	69.

Ashton Tate

dBase II	289.
Friday!	169

Best Programs

PC/Personal Finance Program	65.
PC/Professional Finance Program II	169.
PC/Fixed Asset System	297
PC/Tax Cut	175.

Bible Research

THE WORD (KJV Bible - 7 disks)	145
--------------------------------	-----

Broderbund

Bank Street Writer	59.
--------------------	-----

Bruce & James

WordVision	39.
------------	-----

Continental

Home Accountant Plus	89
FCM (was First Class Mail)	79.
UltraFile (file/report/graph)	119.
The Tax Advantage	39

Digital Research

CP/M-86	39.
Dr.LOGO (requires 192k & RGB monitor)	69.

Financier

Financier II (was Personal Series)	115.
Financier Tax Series	97.

Funk Software

Sideways	45
----------	----

Hayes

Smartcom II	99
-------------	----

IUS

EasyWriter I System	
EasyWriter I, EasySpeller I, EasyMailer I	159

EasyWriter II System	
EasyWriter II, EasySpeller II, EasyMailer II	195.

EasySpeller II for EasyWriter II	59
EasyMailer II for EasyWriter II	59.

Accounts Receivable	295
Accounts Payable	295.
General Ledger	295
Inventory	295
Order Entry	295.
Package Price for any three above	859.
Payroll	359

Lifetree

Volkswriter	115
Volkswriter International	135
Volkswriter Deluxe (with TextMerge)	175.

Lotus Development

1-2-3 (version 1A)	call
--------------------	------

PC Connection Software Special

through July 31, 1984

MICRORIM

R:Base 4000 (new version 1.1)

- Fully relational database
 - 1 billion record capability
 - Improved programming capability
- \$299.

Extended Report Writer

- Expands report capabilities of standard report writer
 - Allows full captions, headlines, and page breaks
- \$85.

Clout

- Permits you to query database in plain English
- \$125.

Micropro

WordStar & ProPak come with quick lesson
CAI training disk and tutorial disk

WordStar 3.3	\$235.
--------------	--------

ProPak (WordStar/MailMerge/	
-----------------------------	--

CorrectStar/StarIndex)	369.
------------------------	------

Microrim

R:base 4000	see special
-------------	-------------

Extended Report Writer	see special
------------------------	-------------

Clout	see special
-------	-------------

Micro Data Base

Knowledge Man (requires 192K)	275.
-------------------------------	------

Microsoft

Multiplan (new ver 1.2)	139.
-------------------------	------

Multi-Tool Financial (for Multiplan)	69.
--------------------------------------	-----

Multi-Tool Budget (for Multiplan)	99.
-----------------------------------	-----

Microsoft Word (new ver 1.1)	239
------------------------------	-----

Microsoft Word (new ver 1.1 with mouse)	
---	--

	289.
--	------

Microstuf

Crosstalk XVI	105.
---------------	------

Infoscope	149
-----------	-----

Transporter (includes Crosstalk)	169.
----------------------------------	------

PCsoftware

PCrayon (create in full color)	34.
--------------------------------	-----

Executive Picture Show	139.
------------------------	------

CREATABASE	59.
------------	-----

Peachtree

PeachPak Series 4 (G/L, A/R, A/P)	
-----------------------------------	--

new version, IBM-size manuals	195.
-------------------------------	------

PeachText 5000 (with ATI Training)	195.
------------------------------------	------

Business Graphics System	179
--------------------------	-----

General Ledger (Series 8) MS-DOS	375.
----------------------------------	------

Accounts Receivable (Series 8) MS-DOS	
---------------------------------------	--

	375.
--	------

Accounts Payable (Series 8) MS-DOS	375
------------------------------------	-----

Inventory Control (Series 8) MS-DOS	375.
-------------------------------------	------

Sales Invoicing (Series 8) MS-DOS	375.
-----------------------------------	------

Job Cost (Series 8) MS-DOS	375.
----------------------------	------

PeachPay (Series 8) MS-DOS	375.
----------------------------	------

Peter Norton

Norton Utilities	\$55.
------------------	-------

Satellite Software

WordPerfect	call
-------------	------

Software Arts

TK!Solver	269
-----------	-----

Financial Management Pack	85.
---------------------------	-----

Mechanical Engineering Pack	85
-----------------------------	----

Software Products

Open Access	389
-------------	-----

Software Publishing

PFS/File	89.
----------	-----

PFS/Graph	89.
-----------	-----

PFS/Write	89.
-----------	-----

PFS/Report	79
------------	----

Softword Systems

MultiMate (w/spell checker)	call
-----------------------------	------

Sorcim

Supercalc 2	159
-------------	-----

Supercalc 3	209.
-------------	------

Virtual Combinatics

Micro Cookbook	29.
----------------	-----

Soups & Salads (add on disk)	15
------------------------------	----

Appetizers & Desserts (add on disk)	15.
-------------------------------------	-----

VisiCorp

Visi On Manager	69
-----------------	----

Visi On Calc	269.
--------------	------

Visi On Graph	139.
---------------	------

Visi On Word	259.
--------------	------

The prices listed below are not misprints.
VisiCorp has made a substantial cut in their prices.

VisiCalc IV (w/StretchCalc)	159.
-----------------------------	------

VisiFile	99.
----------	-----

VisiSchedule	129.
--------------	------

VisiTrend/Plot	69.
----------------	-----

VisiWord Plus (with VisiSpell)	129.
--------------------------------	------

StretchCalc (for VisiCalc)	75.
----------------------------	-----

Warner Software

The Desk Organizer w/1 yr.free updates	
--	--

	179.
--	------

TRAINING

ATI

How to use Lotus 1-2-3	55.
------------------------	-----

How to use Wordstar (vol 1 & 2)	55.
---------------------------------	-----

How to use dBase II (vol 1 & 2)	55.
---------------------------------	-----

How to use EasyWriter II	55
--------------------------	----

How to use Multiplan	55.
----------------------	-----

How to use Your IBM-PC	55
------------------------	----

How to use MultiMate	55.
----------------------	-----

How to use Microsoft Word	55.
---------------------------	-----

How to use PC DOS	55.
-------------------	-----

How to use TK! Solver	55
-----------------------	----

Individual Software

The Instructor	35.
----------------	-----

Professor DOS	47.
---------------	-----

Tutorial Set (both items above)	75
---------------------------------	----

Professor Pixel	47
-----------------	----

• DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS.
© COPYRIGHT MICRO CONNECTION, INC. 1984. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE. IBM IS A REGISTERED TRADEMARK OF IBM CORP. JR. CONNECTION AND MICRO CONNECTION ARE TRADEMARKS OF MICRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK.

PC CONNECTION®



PC Poolside

Over the river and through the woods.

By now it's obvious. PC Connection is the world's most personal purveyor of PC peripherals and programs, at very pleasant prices. Paws down.

But what many PC users don't know is that our sprawling multi-story (two, to be exact) corporate headquarters is located on the banks of the Ashuelot in rustic Marlow, NH (pop. 542).

On that very river, in millenia-old glacial pools, you may chance upon some of our employees, and the occasional small furry animal, cooling off after another hot day on the phone.

PC hardware, software, and leisure wear.

Our trained PC specialists are dedicated to helping you bring your PC to its pinnacle of performance.

Every day, rain or shine, we open the flood gates and ship wave upon wave of PC products downstream to every state in the country, and many of the countries in the world.

Disk drives, video boards, multi-function cards, modems, mice, amenities, and the best software programs in every category, from games to business.

Just give us a call or visit our showroom. We can put an end to any PC predicament. We're fast, reliable, and offer prices as low or lower than anyone else's.

And we can even help you make a splash in the up-and-coming world of microcomputer fashion.

Keep your shirts on.

Better yet, keep *our* shirts on. Stylish polo shirts designed exclusively for PC Connection by Oscar de la Racoon. Available in unisex sizes. Free to anyone who places a \$500.00 order with us between now and September 30.

Just call 1-800/243-8088 or 1-603/446-3383 anytime Monday through Friday 9:00 to 9:00 and Saturday to 5:30. If you're planning to visit us, call ahead to make sure what you want is in stock.



Polo shirts from PC Connection. Limit one per customer. Offer not available to commercial accounts. Please specify XS, S, M, L, or XL.

For the IBM-PC exclusively.

PC CONNECTION®

Circle 136 on reader service card

and the computer

Typing Instructor	\$39
Lightning Software	
Master Type	35

EDUCATIONAL

Davidson

Speed Reader II (<i>high school & college</i>)	49.
Math Blaster (<i>grades 1-6</i>)	35.
Word Attack (<i>grades 4-12</i>)	35.
<i>Additional Data Disks for other ages are available for Speed Reader II and Word Attack at \$15. each</i>	

FriendlySoft

FriendlyWare/PC Introductory Set	35.
--	-----

Knoware

Knoware (<i>requires graphics board</i>)	67.
--	-----

Spinnaker (*All require graphics board*)

Educational Games for Young Computer Users	
--	--

When you send 4 or 5 proofs-of-purchase to Spinnaker, they will send you the game of your choice FREE.

Delta Drawing (<i>ages 4 to adult</i>)	34
Snooper Troops I (<i>ages 10 to adult</i>) ..	30.
Snooper Troops II (<i>ages 10 to adult</i>) ..	30.
Most Amazing Thing (<i>ages 10 to adult</i>)	27.
Face Maker (<i>ages 3 to 8</i>)	23.
Kids on Keys (<i>ages 3 to 9</i>)	23.
Story Machine (<i>ages 5 to 9</i>)	23.
Fraction Fever (<i>ages 7 to adult</i>)	23.
Kinder Comp (<i>ages 3 to 8</i>)	20.
Rhymes and Riddles (<i>ages 5 to 9</i>) ..	20.
Hey Diddle Diddle (<i>ages 3 to 10</i>)	20
Alphabet Zoo (<i>ages 3 to 8</i>)	20

Stone (*requires graphics board*)

Great graphics and sound

My Letters, Numbers, & Words (<i>ages 1 to 5</i>)	29
Kids Stuff (<i>ages 3 to 8</i>) ..	29
Across the U.S.A. (<i>ages 5 & up</i>)	22

GAMES

Atarisoft

Centipede	29.
Pac Man	29.
Dig Dug	29.
Defender	29
Donkey Kong ..	29.

EPYX/Automated Simulations

Temple of Apshai ..	27
Upper Reaches of Apshai	15
Curse of Ra	15
Star Warrior	27
Rescue at Rigel ..	23
Crush, Crumble, and Chomp	23

Blue Chip

Millionaire ..	45
----------------	----

Blue Giant

Hoser	25
-------------	----

FriendlySoft

FriendlyWare/PC Arcade	35
------------------------------	----

PC Connection Hardware Special

through July 31, 1984

TEAC

Half Height Disk Drive 5 1/4" (FD-55B)

- Double Sided/Double Density
- Formats 320k w/DOS 1.1
- Formats 360k w/DOS 2.0 & DOS 2.1
- Fully IBM-PC (and XT) compatible
- Preconfigured for Drive A or Drive B
- Step by step installation instructions supplied
- Covered by 1 year manufacturers warranty

\$165

Free mounting bracket & 'y' power cable with each pair purchased

LIFE IN THE PC FAST LANE

Our goal is to have what you want when you want it. On those rare occasions when we tell you we're out of stock, it means one of several things. The manufacturer is out of stock. A new, favorable review has created heavy demand. An announced product is still unavailable. Or, an updated version of the product is on the way, and we have no intention of selling an about-to-be-obsolete product (even if it means losing a sale). Whatever the reason, rest assured we'll give you as firm an availability date as possible.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge cards
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order
- No sales tax.
- All shipments insured; no additional charge
- Allow 1 wk. for personal & co. checks to clear.
- COD max. \$500 Cash or certified check.
- 120 day guarantee on all products.*
- To order, call us anytime Monday thru Friday 9 00 to 9 00, or Saturday 9 00 to 5 30

SHIPPING

Continental US: For monitors, printers, and drives, add 2% to all orders. For all other items, add \$2 per order for UPS surface, \$3 per order for UPS 2nd-Day-Air. We particularly recommend 2nd-Day-Air if you live west of the Mississippi or south of Virginia. In most cases it will only add \$1 and will save you up to four days on delivery time. **Outside Continental US:** We add freight charges to credit card purchases. For prepayment, call 603/446-3383 for information.

1-800/243-8088

PC Connection 270W
6 Mill St., Marlow NH 03456
603/446-3383

For the IBM-PC Exclusively.

Funtastic

Snack Attack II (<i>a favorite</i>)	\$27
Cosmic Crusader (<i>as good as above</i>)	27
Big Top (<i>climb to new levels</i>)	29
Master Miner (<i>1 or 2 players</i>)	29

Hayden Software

Sargon III	35
------------------	----

Infocom *High quality text games*

Zork I, Zork II, Zork III	each 27
---------------------------------	---------

Starcross	27
-----------------	----

Deadline	35
----------------	----

Suspended	35
-----------------	----

Witness	35
---------------	----

Planetfall ..	35
---------------	----

Enchanter ..	35
--------------	----

Infidel	35
---------------	----

Microsoft

Flight Simulator (<i>new version</i>)	35
---	----

Orion

J-Bird (<i>you'll never sleep</i>)	29
--	----

PC-MAN	27
--------------	----

Paratrooper ..	25
----------------	----

Pits & Stones ..	29
------------------	----

PCsoftware

Armchair Quarterback	27
----------------------------	----

Chess 2001	27
------------------	----

Sir-Tech

Wizardry	42
----------------	----

Sierra/On-Line

Frogger	27
---------------	----

Crossfire (<i>keyboard or joystick</i>) ..	23
--	----

Ulysses and the Golden Fleece	27
-------------------------------------	----

Strategic Simulations

The Warp Factor	27
-----------------------	----

Tigers in the Snow	27
--------------------------	----

Galactic Gladiator	25
--------------------------	----

Epidemic	25
----------------	----

Sublogic

Night Mission Pinball	29
-----------------------------	----

Zee Programming

Zuran Defender	25
----------------------	----

HARDWARE

AST Research (*For IBM-PC or XT*)

All AST Boards come with SuperDrive.

SuperSpool, and one year warranty

SixPakPlus 64k upgradeable to 384k, with clock calendar serial and parallel ports (game port optional)

269

MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel game or second serial port optional)

269

MegaPak 128k (not upgradeable)

MegaPak 256k

call

I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional)

129

Parallel Game, or second Serial Port for any AST board (specify board)

39

Connectall connector bracket (PC only) ..

AST-5251

559

AST-3780

649

PC CONNECTION®

Computing is easy.

MonographPlus with clock calendar, serial & parallel ports \$429

Amdek
Video 300G Monitor (green) 149
Video 300A Monitor (amber) 159
Video 310A Monitor (amber) 179
Color II RGB Monitor 439
MAI Board (color & monochrome) 399

CompuCable
Plastic Keyboard & Drive Covers Set 17
IBM Mono Screen Enhancement 17
Printer to IBM Cable (specify printer) 32
Smartmodem to IBM Cable 25

Curtis
Low Profile Tilt & Swivel Pedestal (for any monitor) 44
PC Pedestal (for IBM Mono or Color) 55
PGS or Quadchrome display adapter 9
System Stand (holds PC vertically) 21
Extension Cables for IBM Mono Display 40
Keyboard Extension Cable (3 to 9 feet) 32
AC Plug Adapter (any monitor to your PC) 8

Electronic Protection Devices
All are rated at 1875 watts 15 AMP
The Lemon 39
The Lime 59
The Peach 64
The Orange 94
The Ground Hog (static eating mat) 69

Epson
RX-80 with GRAFTRAX-Plus call
RX-80 F/T with GRAFTRAX-Plus call
FX-80 with GRAFTRAX-Plus call
RX-100 with GRAFTRAX-Plus call
FX-100 with GRAFTRAX-Plus call
Printer to IBM Cable (specify printer) 32

FTG Data
Light Pen (Push Tip) 159
Demo Disk Set for Light Pen 39

Hayes
Smartmodem 300 209
Smartmodem 1200 499
Smartmodem 1200B (w Smartcom II) 409
Smartcom II 99
CompuCable's Smartmodem-to-IBM Cable 25

Hercules Computer
Hercules Graphics Card (parallel port) 349
Hercules Color Card (parallel port) 179
Graph-X Software 42

IDS
Prism 80 Printer (with all four options) 1397
Prism 132 Printer (with all four options) 1597
Prism to IBM Parallel Cable 32

key tronic
Typewriter style keyboard (KB 5150) call
Deluxe keyboard (KB 5151) call

Koala
Koala Touch Tablet with software (connects to game port) 69

Kraft
Joystick 59
Game Puck (joystick) 59

Maynard Electronics
Floppy Drive Controller \$165
Internal Hard Disk (10 Meg), WS-1 Controller & ROM for PC mother board 995
Internal Hard Disk (10 Meg), WS-2 Controller & ROM for PC mother board 1169

Mouse Systems
PC Mouse 197

NEC
Spinwriter 3550 (IBM-PC compatible) 1679
Spinwriter 2050 (3550's little brother) 919

Novation
Access 1-2-3 (includes Crosstalk XVI) 379

Paradise Systems
MultiDisplay Card (color & mono) 379

Plantronics/Frederick
COLORPLUS (now w/Color Magic) call

Princeton Graphics
HX-12 RGB monitor (690 x 240) call
SR-12 RGB monitor (690 x 480) call
MAX-12 Amber monochrome monitor call

Quadram
We are a full line Quadram Dealer

New Expanded Quadboard 64k expandable to 384k, with clock calendar parallel, serial & game port, I/O bracket, and Quadmaster software 269
Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradable to 512k 197
Quadcolor I 197
Quadchrome RGB Monitor 497
Quadlink (allows you to run most Apple II programs directly on your IBM-PC or XT) 459

Quadisk (various sizes to 72 meg) call

STB
Graphix Plus (color & monochrome) 297

Silver Reed (letter quality, 132 column)
Silver Reed EXP 550 Printer (16 CPS) 589
Silver Reed EXP 770 Printer (30 CPS) 950

TG
Joystick 45

USI (monitors for graphics board)
Pi-2 Monitor (12" green with cable) 119

Pi-3 Monitor (12" amber with cable) \$129

DRIVES

All drives are completely pre-tested. Specify Drive A or Drive B for your PC. Comes with complete step by step installation instructions.

Drives are 320K/360K

Tandon
TM 100-2 (5 1/4") full-height drive (DS,DD) 229

TEAC
FD-55B (5 1/4") half-height drive (DS,DD)
Free 'y' cable & bracket each pair see special

MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board 59
64k Memory Upgrade Set for any memory board specify make of board 59
Install memory upgrades & run diagnostics at time of board purchase only 10

DISKS

Verbatim (with 5 year guarantee)
Datalife Disks SS/DD plastic box of 10 26
Datalife Disks DS/DD plastic box of 10 36
Disk Drive Analyzer 25
Flip Sort (holds 75 disks) 19

INFORMATION SERVICES

Compuserve
Compuserve Information Service includes subscription, manual, 5 hours of connect time, & monthly publications) 39
Executive Information Service 79
Vidtex Software 59
Executive Information Service with Vidtex 119

Source Telecomputing
The Source (subscription & manual) 69
The Source with Sourcelink Software 109

jr connection's on line.

Our new division, Jr. CONNECTION, is ready to serve you with the same kind of excellent products, prices, and support you've come to expect from PC CONNECTION. When you call Jr. CONNECTION, you'll talk to one of our trained PCjr. consultants. They've been working with junior for months. They know what

add-ons you'll need for your application, and what software will run on your system. They can clear up any questions you have about junior, and get you up and computing in a flash. For your PC and XT, keep calling PC CONNECTION. For your PCjr., call Jr. CONNECTION — exclusively for the IBM-PCjr.

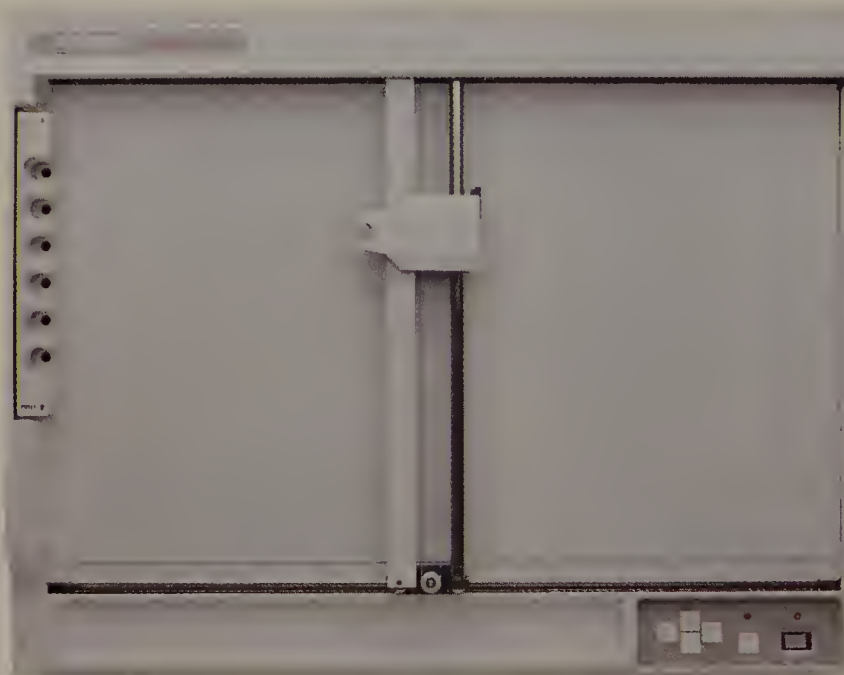
1-800/IBM-jr PC



Circle 136 on reader service card

Pick of the Plotters

Akshai K. Runchal, Jacob Treger, and Clement K. Tam



The Amplot II

Until recently most people in business were content to sketch their ideas or set up a table of numbers on a piece of paper and turn it over to a technical illustrator, who produced the graphs, transparencies, and slides necessary for a business presentation. However, personal computer hardware and software that produce graphs instantly are changing all that.

Computer graphics can be produced on screen or with a pen plotter. To enable you to create graphics on screen, the computer must have a graphics board that enables the screen to be addressed as a checkerboard of dots rather than character by character. Doing graphics on the screen is useful and satisfying; you can make changes easily and see the results immediately. However, it's often necessary to include graphics in a report or to present charts and graphs in a business meeting or seminar. On these occasions a pen plotter comes in handy. Plotters are capable of producing ink drawings comparable to those produced by hand and can be used with paper, vellum, transparencies, or other suitable plotting media.

This article concentrates on high-performance plotters, which are those most likely to be used in a business environment. The three products reviewed are the Houston Instrument Hiplot DMP29, the Hewlett-Packard HP7475, and the Amdek Amplot II. (Certain printers can also be used for graphics, but because their graphics capabilities are limited in terms of versatility and quality, printers are not considered true plotting devices.)

The tests used for this review were limited to business applications such as bar charts, pie charts, and XY plots (line graphs). In contrast, scientific applications often demand contours, vectors, wire-frame diagrams, and perspective and isometric plots. Of course these two applications are not mutually exclusive, and considerable overlap exists in many business environments.



The HP7475

The Hardware

As Table 1 shows, the HP7475 and the DMP29 plotters are generally comparable in hardware features. Their maximum pen speeds and resolutions are close. The HP7475 is more compact and offers a larger number of character sets, pen speeds, and built-in ROM instructions (codes that tell the plotter how to perform functions such as drawing a box or a circle or hatching or filling an area). As Table 2 shows, the HP7475 also has a faster pen acceleration. The DMP29, on the other hand, has eight pens compared to the HP7475's six and has a slightly higher maximum speed. The Amplot II has six pens and a resolution that is four times coarser than the other two. Its maximum speed is approximately half as

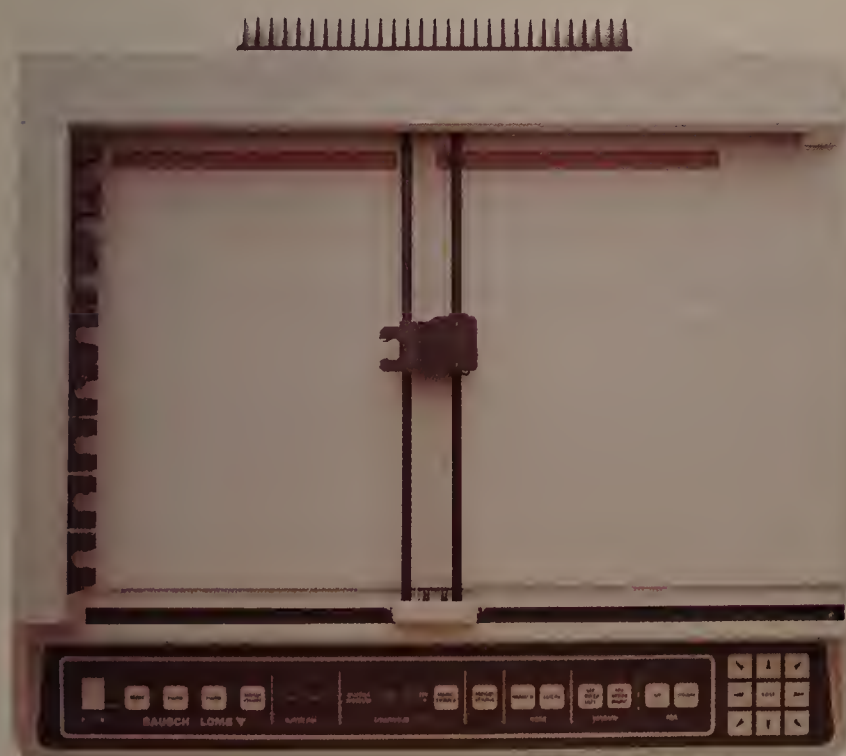
fast as that of the other two, and it has a limited number of built-in character sets and ROM instructions. On the other hand, the Amplot II is considerably less expensive than the DMP29 or the HP7475. The Amplot II comes with a parallel and a serial attachment; the other plotters have serial attachments, and parallel attachments can be purchased separately.

Ease of Use and Versatility

A good plotter should require little effort from the user. It should provide well-defined options and accept simple commands. The commands used to control a plotter may be compared to the language used to communicate with a computer. The higher the level of the communication language (the more English-like it is), the easier the plotter is to use. The versatility and ease of use of a plotter are directly related to the number and simplicity of its built-in commands and functions. Other factors are the quality of the language, the semantics, the error trapping and error messages, and the completeness of the documentation.

The HP7475 provides a good printed manual with a number of examples that illustrate the use of the plotter. The DMP29 manual is only adequate; it isn't as easy for a novice to understand and is poor in terms of examples. The Amplot II came with a preliminary manual that looked like it had been photocopied and was of a poorer quality than the other two.

In terms of ease of use the HP7475 and the DMP29 are comparable (see Table 3). The HP7475 has an edge in the number of built-in instructions it has and in its ability to create labels, to draw axes and rectangles (the latter are handy for bar charts), and to do shading. The DMP29, on the other hand, has more built-in options for plot resolution (the smallest distance that the pen can



The DMP29

Characteristic	HP7475	DMP29	Amplot II
Size of footprint (inches)	14.5 by 22.4	18.6 by 21.9	18 by 22.5
Maximum working area required (inches)	31.5 by 22.4	18.6 by 21.9	18 by 22.5
Height (inches)	5	5.5	5.5
Net weight (pounds)	16	25	23.1
Maximum size of plots (inches)	10.2 by 16.3	10 by 15	10.6 by 15.7
Nominal paper size accepted (inches)	8.5 by 11	8.5 by 11	8.5 by 11
	11 by 17	11 by 17	11 by 17
Number of pens	6	8	6
Number of ROM instructions	56	36	20
Number of built-in character sets	19	8	1
Maximum plot size resolution (inches)	.001	.001	.004
Maximum axial pen speed (inches per second)	15	16	7.9
Possible number of pen speeds	128	5	1
Standard communications interface	serial	serial	serial/parallel
Optional interface	IEEE-488	IEEE-488 parallel	

Table 1: A summary of hardware characteristics

Hardware Features	HP7475	DMP29	Amplot II
Maximum pen speed (inches per second)	15	16	7.9
Maximum acceleration	2G	.5G	---
Repeatability without pen change (inches)	.004	.004	.012
Repeatability with pen change (inches)	.008	.008	.016

Table 2: Speed characteristics

move) and two additional pens and can plot incrementally and automatically smooth curves. The Amplot II lacks many of these features. They may have to be added by writing software, which is not the best solution from the point of view of the user.

The HP7475 is the most intelligent of the three plotters. It provides 56 built-in commands in comparison to the DMP29's 36 and the Amplot II's 20. From the viewpoint of a programmer, the number of commands available translates almost directly into the ease with which custom software can be designed. In this way the Amplot II is especially restrictive.

Some of the HP7475 commands that are missing from the other two plotters are likely to be especially handy for custom software design. In this category are the built-in commands for drawing a rectangle, filling

(shading) areas, typewriter emulation for labeling, and embedding variable strings in labels. In the other plotters these commands, if required, will need to be emulated by software. Some of the commands, though simple in concept, may need complex programming. For example, devising the set of instructions to shade an arbitrary area is not a trivial task. The typewriter emulation command allows a string of characters, such as a label, to be sent to the plotter; characters can be moved left, right, up, or down by a character pitch rather than in plotting increments. The embedded variable string command enables the user to combine a variable, which may change from one plot to another, with text that is otherwise identical from one plot to another. It took us a few hours to write a program in FORTRAN to accomplish the same objective for the DMP29. (We could have done it more quickly in BASIC; however, since we were using existing FORTRAN plotting software, we needed the interface to be in FORTRAN.)

Plotter Feature	HP7475	DMP29	Amplot II
Quality of manual	good	adequate	poor
Examples in manual	sufficient	lacking	lacking
Number of ROM instructions	56	36	20
Built-in options for plot units	1	3	1
Line types available	7	11	4
Scalable line types	6	none	3
User-defined plot units	yes	no	no
Absolute or relative addressing	yes	yes	yes
Incremental mode of plotting	no	yes	no
Ease of drawing axes with ticks	easy	not easy	easy
Hardware window capability	yes	yes	no
Software window capability	yes	yes	yes
Scaling capability from hardware	yes	yes	no
Scaling capability from software	yes	yes	no
Interpolation smoothing	no	yes	no
Ability to rotate plot by 90°	yes	yes	no
Fill area (automatic shading)	yes	no	yes
Labeling with variable substitution	yes	no	no
Typewriter labeling emulation	yes	no	no
Command to plot a rectangle	yes	no	no
Command to plot a circle	yes	yes	yes
Command to plot an arc	yes	yes	yes
Command to plot an ellipse	yes ¹	yes	no
Character slanting option	flexible	one mode only	no
Automatic pen-up when not plotting	yes	yes	yes
Pen holder arrangement	very good	good	fair
Plotter on-line indication	no	yes	no
Indication when plot is outside window being plotted	no	yes	yes
¹ Needs two commands			

Table 3: Ease of use and versatility

Nature of Plot	HP7475	DMP29	Amplot II
Pie chart	5:22	3:30	14:00
Bar graph	3:13	2:15	9:22
XY plot	1:17	0:57	2:30

Table 4: Comparison of plotting speeds for typical business plots shown in Figure 3.

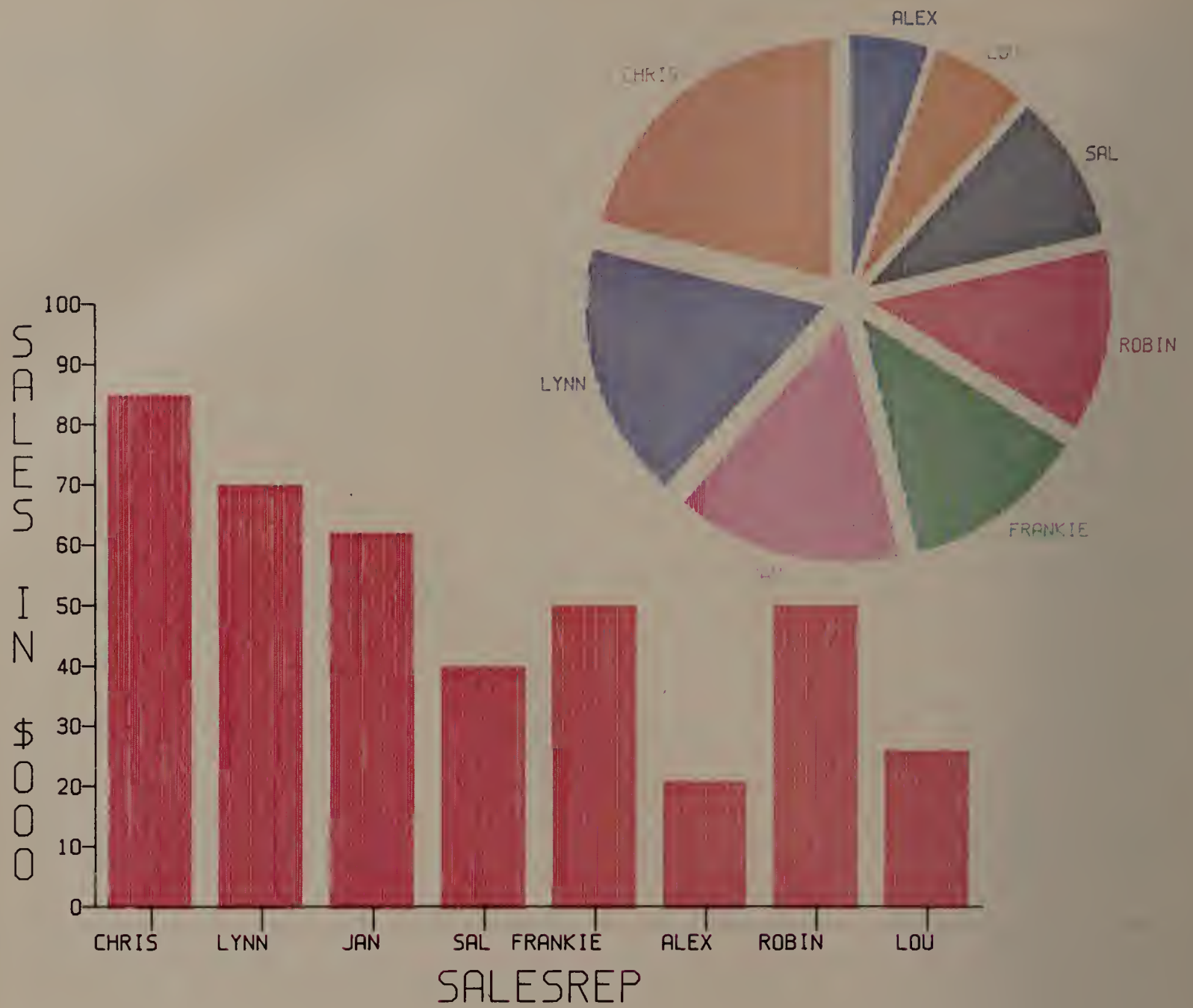
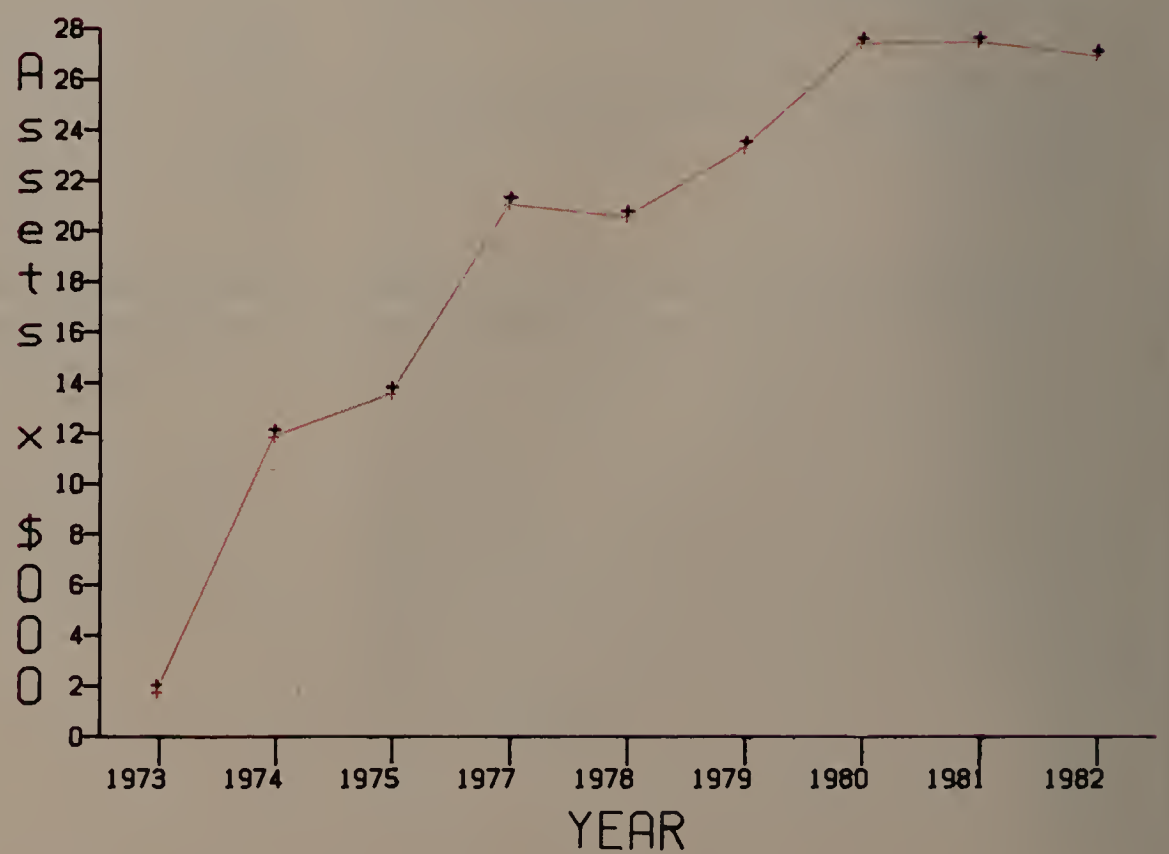


Figure 1: The plots used to test the relative plotting speeds. The graphs shown were produced by the DMP29; identical graphs were produced by the other two plotters.



Speed

The features that determine the theoretical speed of the plotters are summarized in Table 2. The HP7475 leads in these terms, having the highest acceleration and a high pen speed; the DMP29 is a close second, with the highest theoretical pen speed, while the Amplot II has much slower specifications. However, these are only promises. The actual performance of a plotter is strongly influenced by other factors. Depending on the type of plot being prepared, the plotter may spend a lot of time retrieving and replacing pens, writing character sets, getting from one place to another, or even waiting to obtain data from the computer.

What really concerns a user is how long it takes to produce a plot. To test actual performance, the *BPS Business Graphics* software was used to produce bar charts, XY plots, and pie charts. Table 4 shows the times taken to draw the various built-in example charts contained in the *BPS* manual. Figure 1 shows the graphs used for this comparison.

To our surprise, in this particular test the fastest plotter turned out to be the DMP29. The HP7475 was approximately 50 percent slower for all three charts. Since the two plotters have similar maximum pen speeds and the HP7475 has a higher acceleration, the answer had to lie either in the software being used or in the communications link between the computer and the plotters. The pen speeds chosen by *BPS* were the highest for each plotter, and the data transmission rate (in bits per second) was identical in both cases. When we ran some simple experiments such as sending a stream of characters and plotting some simple curves directly from the computer, both plotters took about the same amount of time.

In discussions with the technical support staff at both Houston Instrument and Hewlett-Packard, it emerged that the cause of the plotting speed disparity probably did not lie in the hardware features of the two plotters. Further investigation revealed that the HP7475 driver in the *BPS* package did not optimize the plotter's performance. The HP7475 has a 1K buffer. The *BPS* package, however, sends data in 255-byte strings and imposes a delay of 200 milliseconds between transmissions. This slows the plotter's performance considerably. Therefore, it is possible that with optimized drivers the HP7475 and the DMP29 will deliver similar performances. This conclusion is reinforced by the results of some tests conducted with the *1-2-3* and *Chart-Master* software packages. When these packages were used, neither of the plotters appeared to have a consistent speed advantage; their times for a number of plots were within 5 to 10 percent of each other.

The Amplot II was significantly slower than the other two plotters; it was three to four times slower than the DMP29. The Amplot took 14 minutes to do a simple pie chart. This plotter has no built-in buffer, so it must obtain data from the computer byte by byte as it plots. However, Amdek reports that the plotter draws up to twice as fast when operated in the parallel mode.

The DMP29 provides three plot resolutions: .001 inch, .005 inch, and .1 millimeter (mm). The coarse .005 resolution may speed up the plots considerably under certain kinds of plotting instructions, especially if the information is transmitted to the plotter in a vector mode.

The plotter may spend a lot of time retrieving and replacing pens, writing character sets, and getting from one place to another.

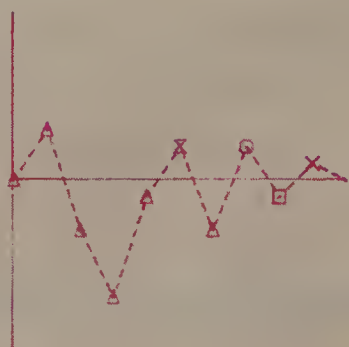
This resolution is often more than adequate; for example, the pie charts for Amplot II shown in Figure 2 employ a resolution of .004 inch. The HP7475 provides only one resolution, .025 mm (.001 inch), and all plots must be done in this resolution.

Quality of Plots

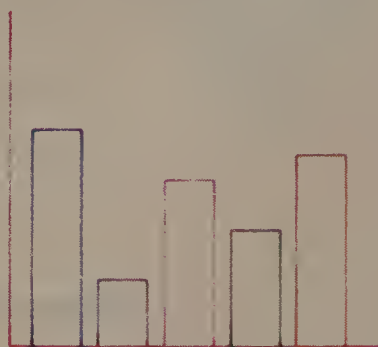
In terms of output quality the HP7475 is the most pleasing. The pie charts produced by the three plotters are shown in Figure 2; the HP7475 has the most even shading and line control of the three. Its line quality and characters are sharp, and it provides high-resolution plots that are more than adequate for most business needs. The Amplot II is a close second, with a good line quality, while the DMP29's drawings are discernibly uneven. The differences are, however, so minor that perhaps they are of no consequence for most applications. The built-in character set of the HP7475 is well balanced and aesthetically the most pleasing of the three. The characters produced by the DMP29 are a little jagged and squat. The character sets of all the plotters can, of course, be replaced under software control.



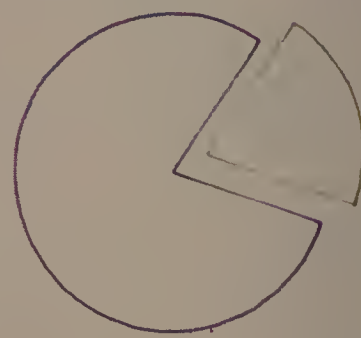
DMP29 MULTI-PEN PLOTTER



LINE GRAPHS



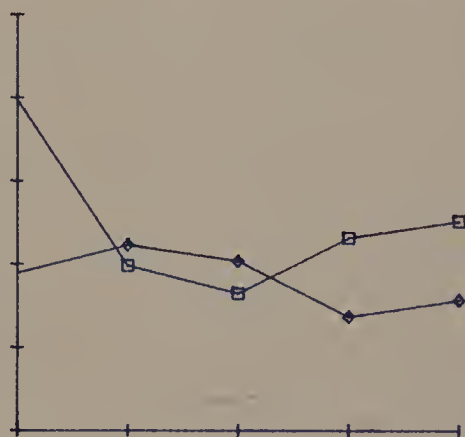
BAR CHARTS



PIE CHARTS

Rev 0923003 0924003 0834003

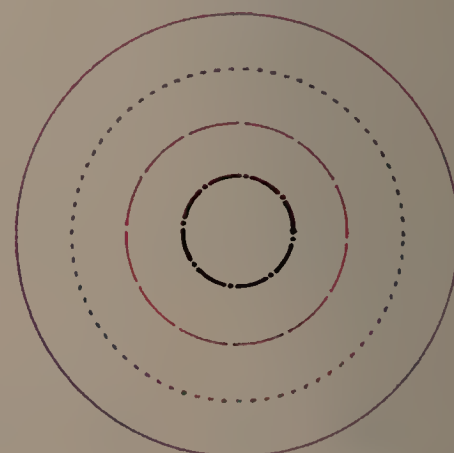
8 DATA BITS
NO PARITY
.005" PASS THROUGH X CONTROL
No Baud
DSR OK Switch Settings: 11100000

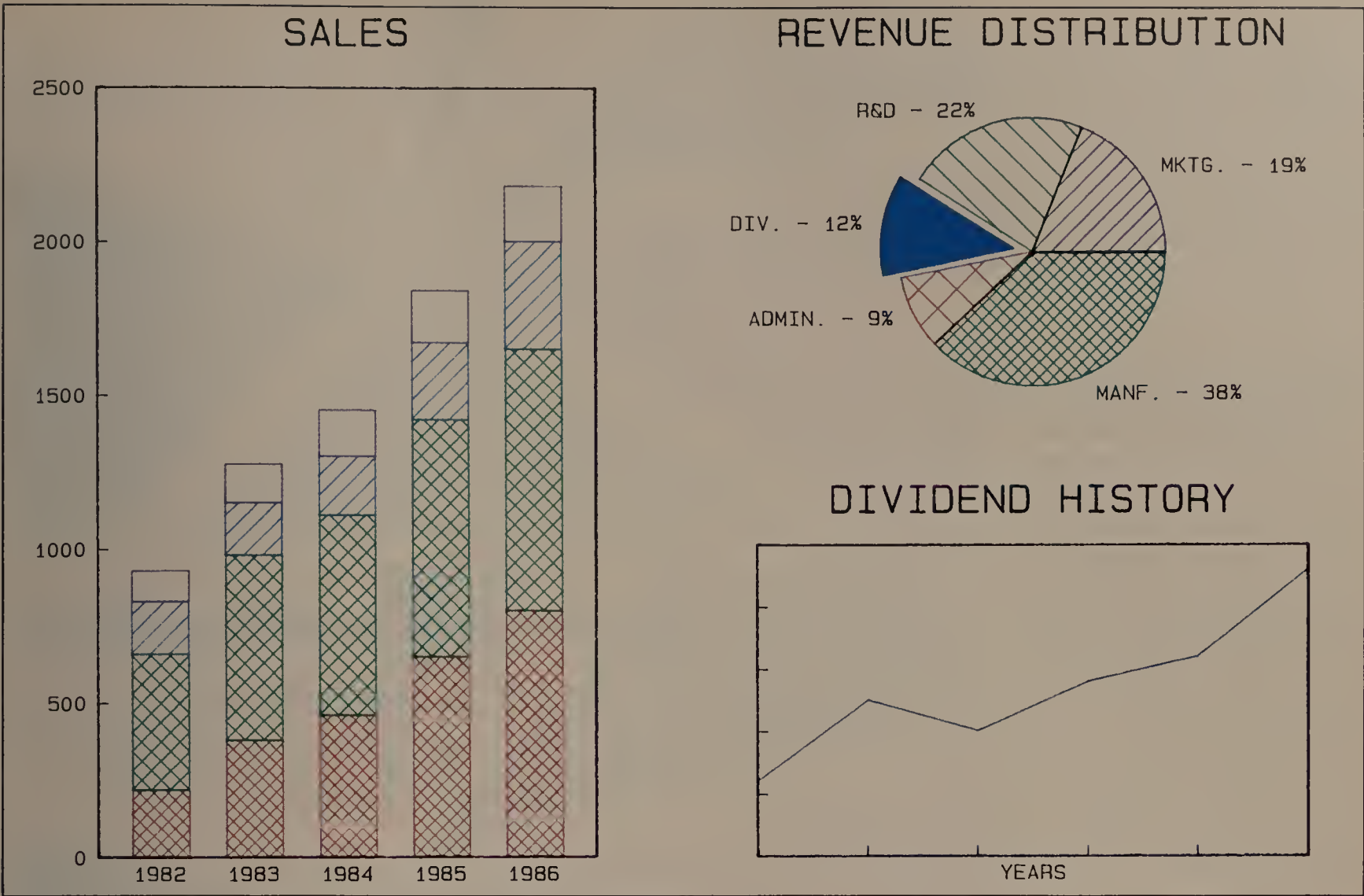


!"#\$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
'abcdefghijklmnopqrstuvwxyz{|}~

◇ □ △ × ○ ×

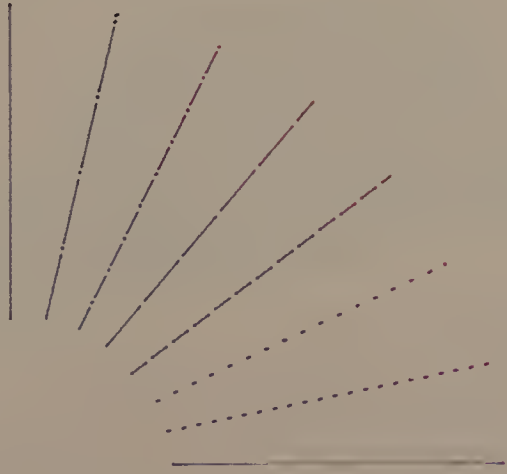
CBABC
CBABC
CBABC





SIZE
SIZE
SIZE
SIZE
SIZE
SIZE
SIZE

AMDEK



AMPLLOT II

The built-in demonstrations and self-tests for the HP7475 (top right), the DMP29 (top left), and the Amplot II (bottom) plotters. Note that the DMP29 prints out the switch settings for the communications parameters as well as the revision number of the ROM installed in the plotter. -4

The line quality of an older version of the DMP29 was uneven. The line varied in thickness or disappeared altogether as the pen moved across the paper. Houston Instrument says that the problem was due to a mismatch between the pen-holding mechanism on the older units and the special adapter required to mount the ink pens. The new units are shipped with a redesigned pen holder. A new unit tested seemed to be free from this problem.

Paper and Pen Movement

The HP7475, the DMP29, and the Amplot II may all be described as "flatbed" plotters. However, there is an important difference between the HP7475 and the other two. Since a plot is a two-dimensional figure, three types of pen movement are needed to complete a plot: one along the length of the paper, one along its width, and an up-and-down motion to make or break contact between the paper and the pen. With the HP7475, the paper is held on both sides between pressurized rollers and moves in and out of the plotter under the pen to provide vertical motion. This plotter may be described as a "moving-paper" plotter. The pen has only two movements: away from and onto the paper or across the width of the paper. With the other two plotters a sheet of paper is held on a flat platform, and the pen does all the moving.

Both the stationary and the moving-paper options have advantages. The moving-paper solution makes possible a compact plotter and a faster pen acceleration because the pen motion is mechanically simpler. However, this design also requires a large working area in front of and behind the plotter. And because the paper moves at a fairly high speed, you may have to suspend plotting to view the progress of work. The stationary paper option makes monitoring the progress of work easy and provides greater freedom in the use of different kinds of plotting media, such as paper or vellum. In addition, the working area is limited to the footprint of the plotter.

The Paper-Holding Mechanism

The plotters all use different mechanisms for holding the paper: paper on the HP7475 is held between rollers, the DMP29 uses adhesive strips that hold the underside of the paper on the platform, and the Amplot II has magnetic strips to anchor the paper on the platform. All three arrangements have pros and cons.

The main problem with the HP7475 paper-holding arrangement is that the pressurized roller may provide a poor grip or leave a mark on the medium if it is either

very thin (such as mylar film) or very thick (such as cardboard). The inexpensive adhesive strip used on the DMP29 may eventually wear out and need to be replaced. The arrangement used by Amplot II seems superior to that used by DMP29, although the magnetic strips can get in the way of the pen when smaller plotting papers are used.

The differences in the paper-holding mechanisms also impose some limitations on the paper sizes suitable for the plotters. All of the plotters accept metric sizes A3 and A4. The distance between the HP7475's fixed rollers is approximately 11 inches, so one dimension of the plotting paper must be close to that size. The other plotters can use any paper size up to a maximum of 11 by 17 inches. However, some improvisation may be required for odd paper sizes. It is easy to use double-sided adhesive tape to hold two edges of the paper to the flatbed; the other two sides are mechanically held by slots along the sides of the plotter bed.

The HP7475 keeps the pens sealed during temporary storage, and the rubber caps keep the pen tips moist.

Pen-Holding Mechanisms and Pen Caps

The HP7475 uses a six-pen carousel that sits in a well to the left of the units. The carousel comes with retractable pen caps that uncover and cover the pens when they are retrieved or replaced. The well has a plastic cover. The DMP29 and the Amplot II have small plastic receptacles mounted to the left of the unit that hold the pens individually. In the Amplot II the pens are lightly held when in use and tend to fall out. For both the DMP29 and the Amplot II, the clearance between the pen nib and the paper is so small that an unevenness in the paper leads to scratches as the pen moves, but this problem is more serious for the Amplot II.

The HP7475 pen cover design is preferable because it keeps the pens sealed during temporary storage, and the rubber caps keep the pen tips moist. With the other plotters, once the pens are in their holders, they are unsealed and therefore tend to dry out if not removed and capped soon after use.



Figure 2: Pie charts drawn by (from top to bottom) the HP7475, the DMP29, and the Amplot II illustrate plotting quality. The HP7475 produces the most even shading and the sharpest lettering.

A minor irritant with the DMP29 is its tiny pen caps. The problem is, what do you do with them when the pen is in use? The front panel of the DMP29 is practically flat with a slight forward slope. If the caps are placed there, they roll off. If left on the work table, these small caps have a habit of proving Newton wrong and disappearing. The HP7475 and the Amplot II have a recessed area in the front panel where the pens and the pen caps can be temporarily stored.

Hardware and Software Support

Both the HP7475 and the DMP29 claim extensive third-party software support. Hewlett-Packard can provide a list of over 200 software vendors that support the HP7475. According to Houston Instrument, the DMP29 is supported by well over 150 vendors. The Amplot II commands a smaller but significant following: the manufacturer claims that more than 60 vendors support this plotter.

All three manufacturers seem to offer extensive customer support. The reviewers have had the DMP29 for over a year. In that time we have been able to get Houston Instrument to answer our questions and solve any problems we've had. The support is reliable and efficient. An independent user of a Hewlett-Packard plotter is also happy with the support he has received. This report confirms the impressive quality of support provided by both manufacturers during the review. We have not been able to locate a long-term user of Amplot II, but our questions to Amdek were answered in a very satisfactory manner.

Recommendations

Now for the difficult part: which one do we recommend? As always, the choice to some extent depends on the purchaser's needs and budget. For most business environments we recommend either the HP7475 or the DMP29. The Amplot II may be too slow for most business environments, where time is one of the most important commodities. The Amplot II also has the fewest built-in instructions, which translates into the use of expensive programming labor for custom applications when no prepackaged software can be used.

The choice between the HP7475 and the DMP29 should perhaps be made on the basis of the following three factors: the type of software and plotting media to be used and the available working space. If you plan to use primarily prepackaged software, require plots on

special media (such as vellum, mylar, or cardboard), and have limited working space, the DMP29 may be the better choice; otherwise, the HP7475 is a safe bet. Since most business needs can be adequately met with plots on paper and transparencies, we prefer the HP7475. However, we strongly recommend that your final choice be made with reference to individual plotting needs. ●

Akshai K. Runchal is president of Analytic and Computational Research, Inc., a computer software and hardware consulting firm that specializes in scientific and engineering applications. Jacob Treger and Clement K. Tam are freelance computer consultants.

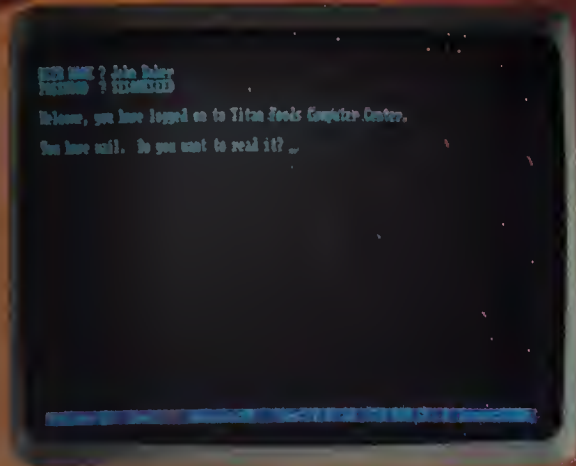
*Amplot II
Amdek Corp.
2201 Lively Blvd.
Elk Grove Village, IL 60007
312/364-1180
List price: \$1099
Requirements: cable, parallel or serial port*

*BPS Business Graphics
Business & Professional Software
143 Binney St.
Cambridge, MA 02142
800/DIAL-BPS, 617/491-3377
List price: \$350
Requirements: 128K, two disk drives*

*HP7475 Graphics Plotter
Hewlett-Packard
Marketing Communications
16399 W. Bernardo Dr.
San Diego, CA 92127
619/487-4100
List price: \$1895
Requirements: cable, parallel or serial port*

*Hiplot DMP29
Houston Instrument
8500 Cameron Rd.
Austin, TX 78753
512/835-0900
List price: \$2295
Requirements: cable, parallel or serial port*

OMNITERM 2 COMMUNICATIONS WITH YOU IN MIND



What the novice has in mind

You know what you want, asynchronous communications software you can trust to be accessible and uncomplicated. Plus power for the long run as you discover new communications possibilities. OMNITERM 2 from Lindbergh Systems works with you to help get the job done:

- ☐ file transfer and terminal emulation compatible with *any* modem and *any* remote computing resource
- ☐ menus help you choose settings quickly without having to memorize complex, multiple commands
- ☐ color coding, prompts, highlighting and audible response give you instant feedback as you use the program
- ☐ support you need including free telephone consultation, clear, concise documentation, a keyboard overlay, and on-line help
- ☐ proven software—OMNITERM 2 for the IBM-PC is an evolution of the successful OMNITERM 1 program, which consistently earns rave reviews in national magazines such as *Byte*, *InfoWorld* and *80-Micro*

What the expert has in mind

You know what you want, powerful software for business and professional communicating. You don't have time to waste working around software limitations. You know from experience how extra features can make the difference between getting the job done or not. OMNITERM 2 provides all the standard features of professional communications software plus many extras:

- ☐ complete set of translation tables allowing independent configuration of I/O devices for full compatibility of all 256 possible characters
- ☐ single-line editor for correcting and retransmitting mistyped lines while in terminal mode
- ☐ scroll-back feature allows you to review old text while answering electronic mail, reviewing instructions, etc.
- ☐ full control of echo and line feed including the standard options of full or half duplex, plus a setting for use with remote terminals, and an option to define your own unique setting for unusual situations
- ☐ an information packed status line including real-time information on file I/O, several timers, modem status, and more
- ☐ user-definable "pause accept" and "pause request" functions allow automatic two-way handshaking with any computer system
- ☐ plus VT100 emulation, XMODEM file transfer protocol, macro strings, disk directory, file viewing and erasing, save settings file, automatic phone dialing and logon, printer control, display control, unattended operation, diagnostics, full screen editing, and many more features too numerous to mention

Omniterm2

PROFESSIONAL COMMUNICATIONS SOFTWARE

OMNITERM 2 is \$245. You need an IBM PC or XT or fully compatible personal computer with at least one disk drive, 128K memory and an asynchronous communications board.

OMNITERM 2 works with any modem. OMNITERM 1 is also available for the TRS-80 line. See your dealer or call Lindbergh Systems.

Lindbergh Systems, 49 Beechmont Street, Worcester, MA 01609, Telephone: (617) 852-0233, Source: TCA818, Delphi: LINDBERGH, CompuServe: 70310,267

IBM PC and IBM XT are registered trademarks of IBM. TRS-80 is a trademark of Tandy Corporation.

Circle 623 on reader service card

the Total Solution **EVEREX** EVER for EXcellence

**NOW...the only source you'll ever need
besides IBM® in your IBM PC is EVEREX**

When we, at Everex, took a look at what PC users, like you were doing with the IBM PC — we found most of you had the same concerns. So, in response to your needs we have solved the important problem of **service and support** when it comes to expanding your IBM PC. Buying from separate sources can mean getting passed between suppliers when a problem arises. It's always "the other guy's fault." We offer **quality and performance** in our **full range** of plug-in controller cards, storage and back-up systems. We also warranty and stand behind all of our products and combination packages.
EVEREX — THE TOTAL SOLUTION for your IBM PC/XT.

We offer you MORE!

GRAPHICS

- **The GRAPHICS EDGE™** — drives **simultaneously** both a color and monochrome monitor, runs Lotus 1-2-3™ and it's full graphics, Microsoft Flight Simulator™ and all IBM Color Graphics software on your monochrome monitor, 132 col x 44 row capability, and includes printer port and light pen interface. Sugg. Retail — \$499
- **The ACE™** — Advanced Color by Everex. Ace combines NEC 7220 GDC, with 256k bytes of display memory expandable to 2M bytes. It allows a display of 16 colors expandable to 256 colors simultaneously from a palette of 4096 colors, with a resolution from 720x720 to 1440x1440. Sugg. Retail — \$995
- **The GRAPHICS PACER™** — a combination of monochrome graphics, a floppy disk controller, printer port, and light pen interface. This board is fully compatible with the IBM monochrome display adapter and will run a wide variety of popular software packages including Lotus 1-2-3 in full graphics. Sugg. Retail — \$489
- **The COLOR PACER™** — our color version of the Graphics Pacer. Sugg. Retail — \$389
- **EVERCOLOR™** — fully compatible with IBM's color graphics adapter. Includes a printer port and 2 pages of display memory. Includes light pen interface. Sugg. Retail — \$260
- **EVERGRAPHICS™** — High-resolution graphics on IBM monochrome monitor plus a printer port and light pen interface. Operates popular software packages including Lotus 1-2-3 in full graphics. Sugg. Retail — \$289

MULTIFUNCTION

- **The MAGICCARD™** — multiple functions include 0—384K address selectable memory, one ASYN port with second optional, one printer port, a game port and clock/calendar functions. Bundled with this card is \$400 worth of software including EVERCLOCK, EVERSPOOLER and EVERDISK software utilities and two useful application programs: PC—Write™, a word processor, and FormManager™, an electronic filing system. Sugg. Retail — \$275





STORAGE

- **HARD DISK DRIVE with EVEREX CONTROLLER** — from 10MB to 40MB. Internal or external system, with no heating problems and requires no software patches. Makes your PC work like an XT! Two-year warranty. Sugg. Retail from \$1,195
- **HIGH-PERFORMANCE STREAMING TAPE DRIVE with EVEREX CONTROLLER CARD** — allows you to back up in minutes. Available in 20MB to 45MB. Half-height version can be combined with half-height hard disk drive, to be installed internally into your PC/XT. Sugg. Retail from \$1,135
- **EVEREX HARD DISK CONTROLLER** — direct plug-in, letting your PC boot up from the hard disk drive without the use of software patches. Sugg. Retail - \$350
- **EVEREX FLOPPY DISK CONTROLLER** — direct plug-in, controls up to 4 floppy disk drives. Sugg. Retail - \$220
- **STREAMING TAPE CONTROLLER** — direct plug-in for high-performance streaming tape. Sugg. Retail - \$315

- **ULTRA DISK™** — two controllers in one, using one slot. Controls both hard disk and floppy disk drives. Direct plug-in for IBM PC. Sugg. Retail - \$525

For more information on all of these Everex Products, contact your local dealer.

OEM and Dealer Hotline 800-821-0806.
In California call 800-821-0807.

OEM Inquiries Welcome.

PC Write™ is a trademark of Quicksort, Inc.
FormManager™ is a trademark of BIT Software, Inc.
IBM is a registered trademark of International Business Machines Corp.
Lotus 1-2-3 is a trademark of Lotus Development Corp.
Graphics Edge, Ace Graphics Pacer, Color Pacer, Evercolor,
Evergraphics, Ultra Disk and MagicCard are trademarks of Everex Systems, Inc.
Microsoft Flight Simulator is a trademark of Microsoft Corp.

Price subject to change without notice.



Everex Systems, Inc.

891 Maude Ave., Mountain View, California 94043 (415) 967-1495

AD-100

Circle 699 on reader service card

Little Wonder

All you need for less. Finally there's an affordable program flexible enough to be applied precisely to your specific situation. Our six years of software consulting experience plus Hubbard's 25 years in manufacturing management let us know what you do need — and what you don't.

Business transactions require more than a spread-sheet. The TRACKER II System with multiple file updating provides much greater potential for you than limited, single file programs like pfs® file, yet without the expensive complexity of dBase II.™ Instead, our system has 95% of the work already done. It adapts easily to the exact way your business is run and its records kept.

Messrs. Little introduce the answer to the high cost of customized programming: the new TRACKER II™ System for IBM® PCs and compatibles.

Set up and run in less than a day with no prior training. All you need to know is what you want to do. With our simple on-screen instructions and matching-image TRACKPAC booklets, it's as if we were right there in consultation with you.

Take general Time Accounting for example. You adjust and install the file layout for customers, projects,

employees, etc. Then you organize time and expense inputs. Individual reports can be added later. In addition, printing output such as invoices can be fit to your format of forms and reports.

Once that's done, all your operator does is answer simple questions. If one can read, one can handle it.

Each single input updates all affected files. Day-to-day data need only be typed in once. Each input goes everywhere it should automatically, ending errors from repetition.

The input also gets processed differently depending on your pre-selected "if...then" alternatives. For instance, one worker's hours may be billed at separate rates for separate tasks with no need for the operator to know all the details. Cumulative calculations are automatic. This is computing power unheard of at this price.

Try it risk-free for 30 days. Pick up the phone and get on track today. With our moneyback guarantee, there's no way you can lose.

The TRACKER II System with general Time Accounting included. **\$250***

To order, call toll-free 1-800-336-2966. In Ohio call (216) 464-5013. Use your VISA or MasterCard.

TRACKPAC Application kits let you keep track of even more.

You can use the TRACKER II System with the general Time Accounting TRACKPAC kit provided, or purchase one of those listed for \$65* or set up your own application.

- Job Costing/Scheduling
- Cost Estimating
- Order Entry/Billing
- Inventory w/sales & purchasing
- More to come

*(Plus \$3 shipping and handling. Ohio residents add sales tax.)

IBM is a registered trademark of International Business Machines Corporation. pfs is a registered trademark of Software Publishing Corporation. dBase II is a trademark of Aston-Tate © 1984 Analex Computing, Inc. Printed in U.S.A.

Earn Royalties

Submit a running application of your own design, and if we decide to market it, royalty arrangements will be made. A submittions kit is included with the TRACKER II System or can be purchased separately for \$5.

analex

The fast track to success.

Analex Computing, Inc.
5222 Richmond Road,
Cleveland, Ohio 44146

Hubbard Little, Vice President
Mark Little, President

Circle 772 on reader service card

PGS introduces the no-compromise monitor to meet your no-compromise needs.

High resolution

Once you're invested in a 19" high resolution monitor, you don't want to compromise with a low-resolution monitor. That's why PGS introduced the first high-resolution monitor, the Princeton HX-12. It set the price/performance standard for high-resolution RGB color monitors.

Super resolution

Now, we're introducing the first no-compromise monitor in the super resolution class. It's the new SR-12: an RGB monitor that meets the most demanding expectations at a price that will surprise you.

Monochrome

And, for price/performance in a monochrome monitor, we're introducing the MAX-12: our new amber monitor that's as easy on the eyes as it is on your budget.

The monitor to meet your needs

All three PGS monitors are engineered for no-compromise performance to provide you with a cleaner, sharper image than any other monitor in the same price class. The HX-12 and the SR-12 both feature uncompromising color convergence for crisp whites without color bleed. The MAX-12 offers impressive clarity in a monochrome monitor with easy-on-the-eyes amber phosphor.

And all three monitors come with a non-glare screen and a shielded cable that plugs directly into the IBM PC or XT.

The HX-12 has the highest resolution (690x240) and the finest dot pitch (.31mm) in its class. And yet its suggested retail price is comparable to many medium resolution monitors. The HX-12 brings no-compromise color to the PC and now, with the PGS RGB-80 board, to the Apple IIe as well. **Suggested retail price: \$695.**

The new SR-12, in conjunction with the PGS high performance color graphics card, also features a .31mm dot pitch supporting 690 horizontal resolution. However, by increasing the horizontal scan rate to 27.5 KHz, the SR-12 can support 400 vertical resolution in non-interlaced mode. This results in a very high quality, flickerless image with the ability to generate graphics and text that is truly of monochrome quality. **Suggested retail price: \$799.**

The new MAX-12 offers you easy-on-the-eyes amber with 720x350 resolution at a suggested retail price (\$249) that is actually lower than the leading green-on-black competitor. And the MAX-12 runs off the IBM PC monochrome card—no special card is required.

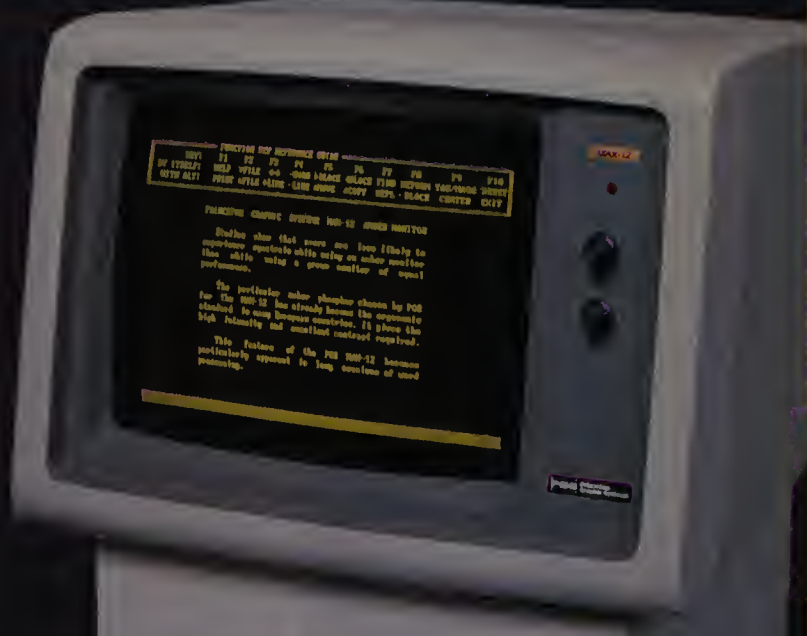
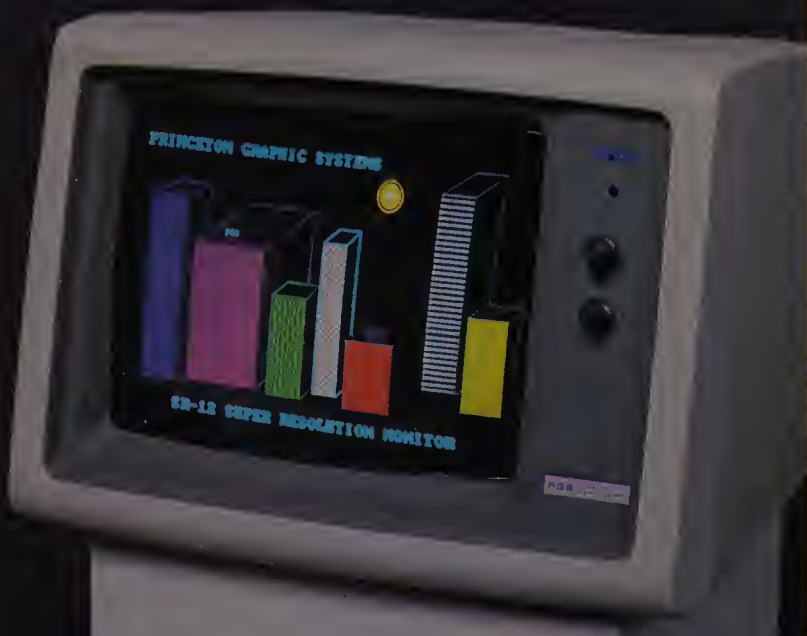
Clarity of the Max 12 is enhanced by dynamic focusing circuitry which ensures sharpness not only in the center but also in the edges and corners. **Suggested retail price: \$249.**

Whatever your needs, from word processing to super resolution graphics, there's now a no-compromise PGS monitor that sets the standard. Ask your dealer for a demonstration and let your eyes decide. Or call for more information and the name of your nearest dealer.

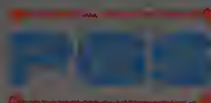
You can look to PGS for the image your eyes deserve.



NEW: adapter available for PCjr.



800-221-1490



Princeton Graphic Systems
An Intelligent Systems Company

1101-I State Road
Princeton, New Jersey 08540
609 683-1660 TLX 6857009 PGS Prin

Now available at Computerland, Entré and local independent computer dealers. Nationwide service provided by Bell and Howell Service Company and MAI Sorbus Service Co.

Circle 296 on reader service card

With one line you can draw a thousand conclusions.

Without a good line, it's difficult to draw much of anything. And Taxan has an extraordinary line.

It's a dozen computer display monitors (RGB and composite as well as monochrome), one printer buffer, a television conversion tuner, several coaxial cables and a multitude of PC cards long. All segments designed and manufactured to represent the utmost in computer

display technology.

The Taxan product line.

The only one of its kind. Backed by a solid reputation and 15 years in the computer display industry.

So, if you're in the market for a computer monitor or related accessory, just ask one of our dealers to demonstrate our full line.

You can draw your own conclusions.



TAXAN
TAXAN
TAXAN

Taxan Corporation

18005 Cortney Ct. City of Industry, CA 91748

(818) 810-1291

Qubie' gives you the three Pluses: Quality, Service, & Low Prices



We were tempted to headline this ad with "The 1, 2, and 3 of why you should buy AST from Qubie." We are as tired of ads with that logo as you are, so we settled on "+ + +". Actually, the plus really tells it better. The AST Research plus of quality is the reason they have the number one expansion products for the IBM PC. The Qubie' Plus of service has made us the largest dealer for AST products. You don't supply the likes of IBM, Exxon, General Motors, and Lockheed, unless you have premier products and service. Top it all off with low, Qubie' prices, and you have the reason tens of thousands of corporations, institutions, and PC owners have come to Qubie' for expansion products.

Take Your Choice

We have the range of multifunction boards for IBM PC's and compatibles that gives you the choice of functions right for your needs. The AST research MegaPlus II™ is the most flexible expansion product available for the PC. Its younger brother, SixPakPlus™ is the standard the competition measures themselves against. I/O Plus II™ is the answer for those who need serial and printer ports and automatic time and date loading, but already have their memory needs satisfied. MonographPlus™ is a multi-function monochrome graphics board. It offers the high resolution of the IBM monochrome board, along with flicker-free 1-2-3™

graphics, clock/calendar, printer port, and optional serial port. Standard with all four is the award winning AST SUPERPAK software. You get SUPERDRIVE™ electronic disk emulation and SUPERSPOOL™ print spooling software. All are backed with a 1 year parts and labor warranty.

MegaPlus II™		I/O Plus II™	
\$229 includes:	Options:	\$149 includes:	Options:
Clock/calendar with battery	64k memory \$55	Clock/calendar with battery	Game Port \$35
back up	2nd async port \$35	back up	Printer Port \$35
Asynchronous communications port, (RS232C serial, COM1 or 2)	Printer port \$35	Asynchronous communications port, (RS232C serial, COM1 or 2)	2nd Async Port \$35
Memory sockets for up to 256K	GamePak \$40	AST SuperPak Software & Q-Quick Menu	
AST SuperPak Software & Q-Quick Menu	MegaPak 256k \$299		
	MegaPak 128k \$199		
SixPakPlus™		MonographPlus™	
\$229 includes:	Options:	\$449 includes:	Options:
Clock/calendar with battery	64k memory \$55	IBM PC compatible Monochrome Card	Serial port \$35
back up	Game Option \$35	720x348 1-2-3* compatible graphics	
Asynchronous communications port, (RS232C serial, COM1 or 2)		Clock/calendar with battery	
Memory sockets for up to 384k		back up	
Parallel Printer Port (LPT1 or 2)		Parallel Printer Port	
AST SuperPak Software & Q-Quick Menu		AST SuperPak Software & Q-Quick Menu	

The Qubie' Plus

You can't be successful without providing good service. It starts with answering your questions before and after you buy. Since we only sell a few selected items, we have the information and the inventory to help you fast. We will ship your order the day after you call. And we're just as ready when something goes wrong. We will repair your board within 48 hours in our service department—not just be a relay point to the manufacturer.

Free Extras Too

The Qubie' Plus also means no cost extras like the Qubie' bracket which allows ribbon cables to be mounted without interfering with other expansion slots. Or the Q-Quick Menu™ which provides easy arrangement of Superdrive's and the size of your SuperSpool printer buffer, without having to remember how the commands work. Both are Qubie' exclusives at no extra cost to you. And it's offering extra service when you need it like our PREFERRED CUSTOMER PLAN. For \$50 extra the plan offers 24 hour repairs on warranty work, and gives you a second year of warranty coverage.

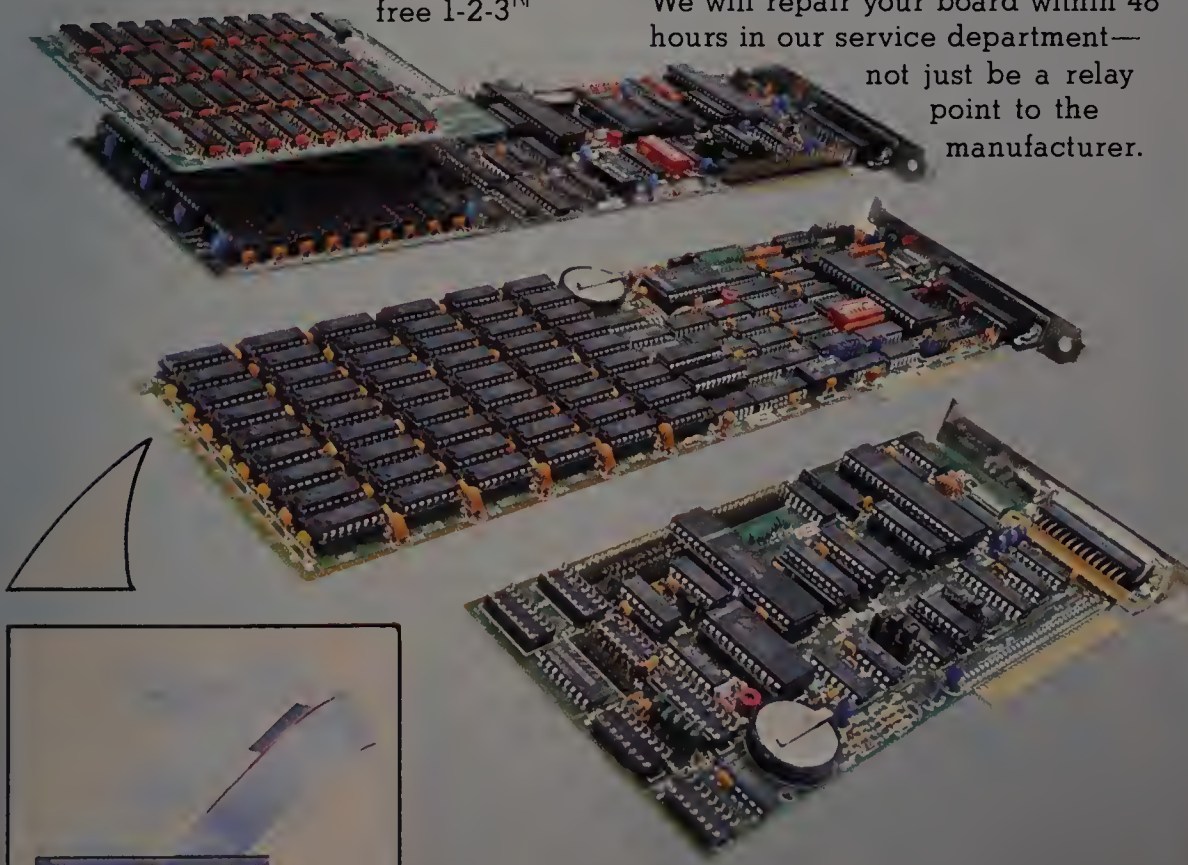
Don't Forget The Bottom Line

If you feel compelled to skim through the magazine and make a strict price comparison, remember, our price is the whole price. No extra charges for shipping, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just \$5 extra.

The Acid Test

If you are not completely satisfied with any Qubie' product after 30 days, you can return it for a full refund. We will even reimburse you for the postage to return it. If you can get any of our competitors to give you the same guarantee, buy any other board you think compares and return the one you don't like. We know which one you'll keep.

IBM is a trademark of International Business Machines Corporation.
AST is a registered trademark of AST Research, Inc.



Qubie' Bracket Free With Any Option

Order Today, Shipped Tomorrow!

All prices include UPS surface freight and insurance. Add \$5 for two day air service. For fastest delivery send certified check or credit card. Personal checks take 18 days to clear. Calif. residents add 6% sales tax. Corporations and Institutions call for purchase order details.

(800) 821-4479

Toll Free Outside California

(805) 987-9741

Inside California

QUBIE'

4809 Calle Alto
Camarillo, Ca. 93010

Tempo House, 15 Falcon Road,
London SW11 2PH, United Kingdom

Copyright Qubie' 1984

Circle 605 on reader service card

At long last, there is the business mind with the business system, effortlessly. Software so totally different and uniquely intelligent that it can create and carry through complex projects by itself. Extraordinary software with the capacity to adapt to a range of users' abilities, and grow in sophistication as their needs expand.

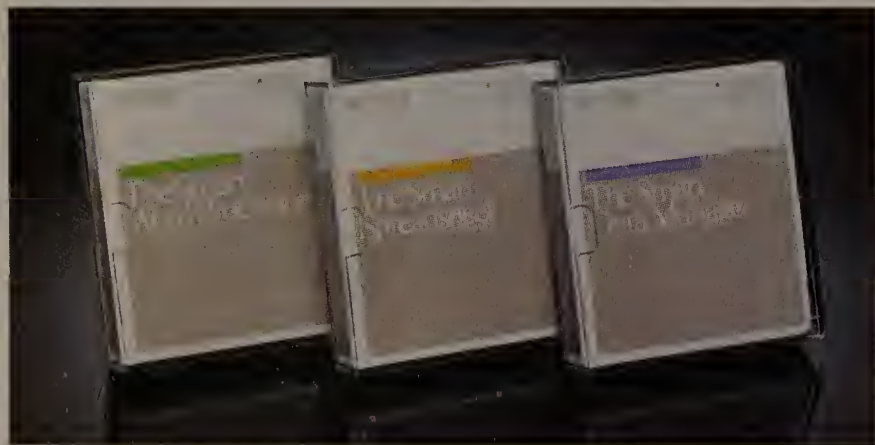
Introducing Smart Software from Innovative Software.™ There's never been a software system like it before. Nor is there anything else like it today.

That's because no other software has the capability to complete and repeat complex projects—from start to finish—on its own. Not by memorizing keystrokes (like a macro), but by adjusting to your project changes; and open-endedly performing dedicated applications.

Entire projects—spreadsheet to data base to graphics to word processing—can be completed without supervision; freeing your time for running your business, rather than running your business software.

In addition, Smart Software puts to rest, once and for all, the *ease-of-use* versus *power* dilemma, because this unprecedented software is as workable for beginners, as it is powerful for experts.

Smart Software was created to work for you, relentlessly. Structured to integrate with its smart mates, automatically. And designed to communicate with not-so-smart software, brilliantly.

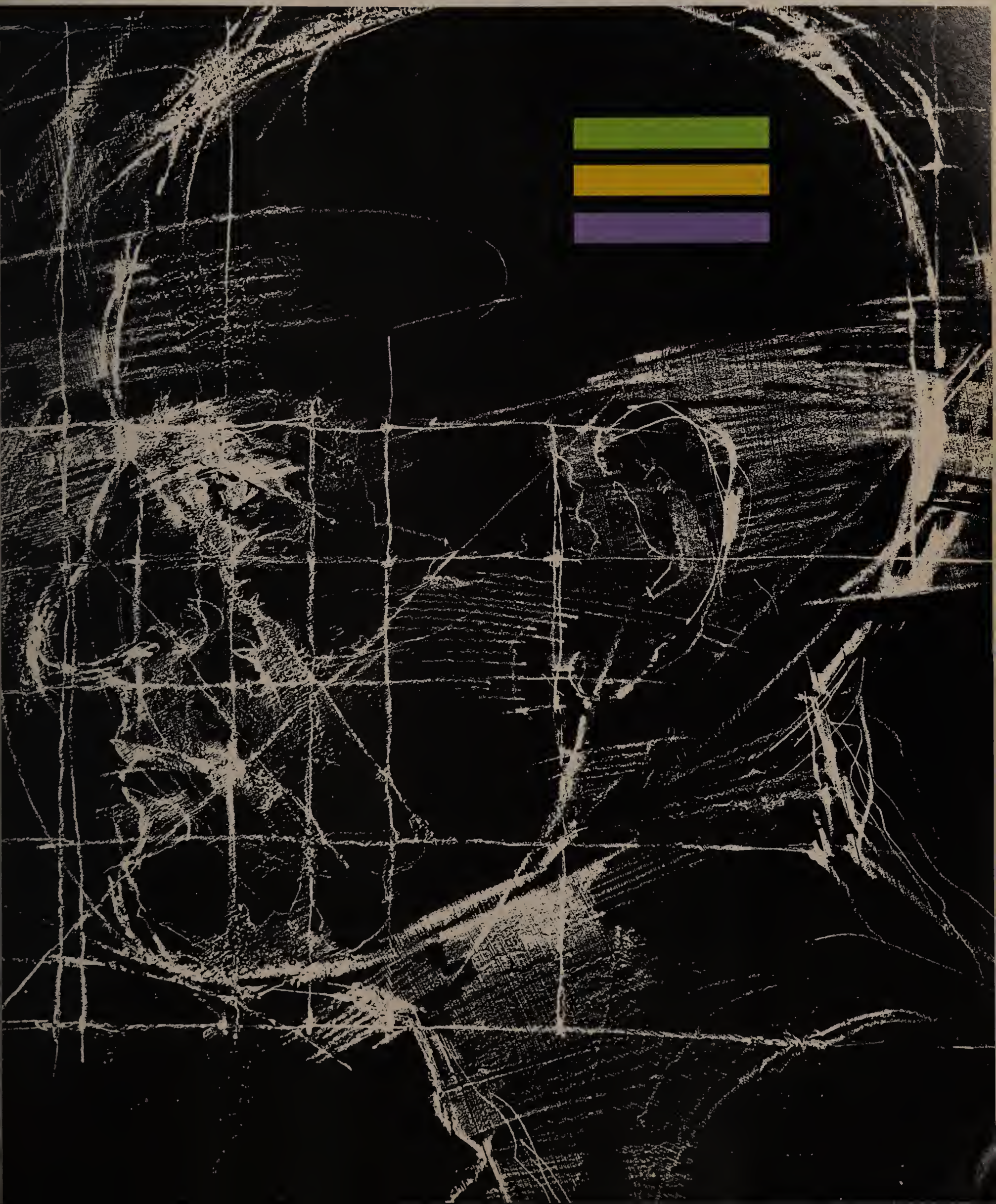


For more information on the fully-integrated Smart Software System, call 800-GET-SMART or visit your local computer dealer for a demonstration.

The one-of-a-kind Smart Software System. Undoubtedly the most productive tool ever conceived for the business mind.

INNOVATIVE
Software

software that links



Beyond Bar Charts

For on-screen analysis 1-2-3's graphics are hard to beat, but Chart-Master and BPS Business Graphics are better for presentations.

Burton L. Alperson

Lotus Development's 1-2-3 has become the most commonly used software for data manipulation and representation on the PC. Although the heart of the program is its spreadsheet, 1-2-3 also contains graphics routines that are fast, powerful, and easy to use. However, many 1-2-3 users find themselves limited by the program's lack of functions and graph types. Horizontal bar graphs, area graphs, and pie charts with exploding slices are all beyond the reach of 1-2-3. The program cannot handle floating legends and many types of fitted curves. Compared to most dedicated graphics programs, 1-2-3 supports a limited number of printers, plotters, and other output devices.

Consequently it is reasonable to ask if a dedicated graphics program can provide enough additional power over 1-2-3 to justify its expense. This review examines two comparably priced graphics packages for the PC: *Chart-Master* from Decision Resources and *BPS Business Graphics* from Business & Professional Software.

Graphic representation of data serves two main functions—analysis and presentation (see “The Boom in Business Graphics” in this issue). The major objective of analysis graphics is the rapid manipulation of on-screen images to discover relationships that

If your main interest is analysis, there is little advantage in going beyond 1-2-3.

might have gone unnoticed from a table of numbers. If your main interest is analysis, there is little advantage in going beyond 1-2-3. Due to the designs of the user interfaces and the slow plotting speed on a monitor, neither *Chart-Master* nor *BPS Business Graphics* can compete with 1-2-3 for strictly analytical purposes.

Both *Chart-Master* and *BPS Business Graphics* are designed primarily for presentation graphics, where the emphasis is on making a point or telling a story. In presentation graphics,

program flexibility and a variety of graph types and functions become far more important than speed. Both programs are superior to 1-2-3 for creating professional presentation graphics.

The Interocular Traumatic Test

Figures 1, 2, and 3 illustrate, in sequence, an increased ability to tell a story. The story is that a certain drug has a dramatic influence on hypertension. Putting yourself in the role of the presenter, try to ignore all considerations of scientific validity and experimental design. Using these charts, you want to convince your audience that the data from this one patient shows the effectiveness of the drug.

Figure 1 was developed with 1-2-3. Although an experienced graph reader could figure out the story, the graph would not pass the Interocular Traumatic Test (you know what the conclusion is when the data hit you between the eyes). Several compromises had to be made to accommodate 1-2-3's lack of flexibility. The variable labels (Sy, Di, Mean Pre Sy, Mean Pre Di) had to be abbreviated

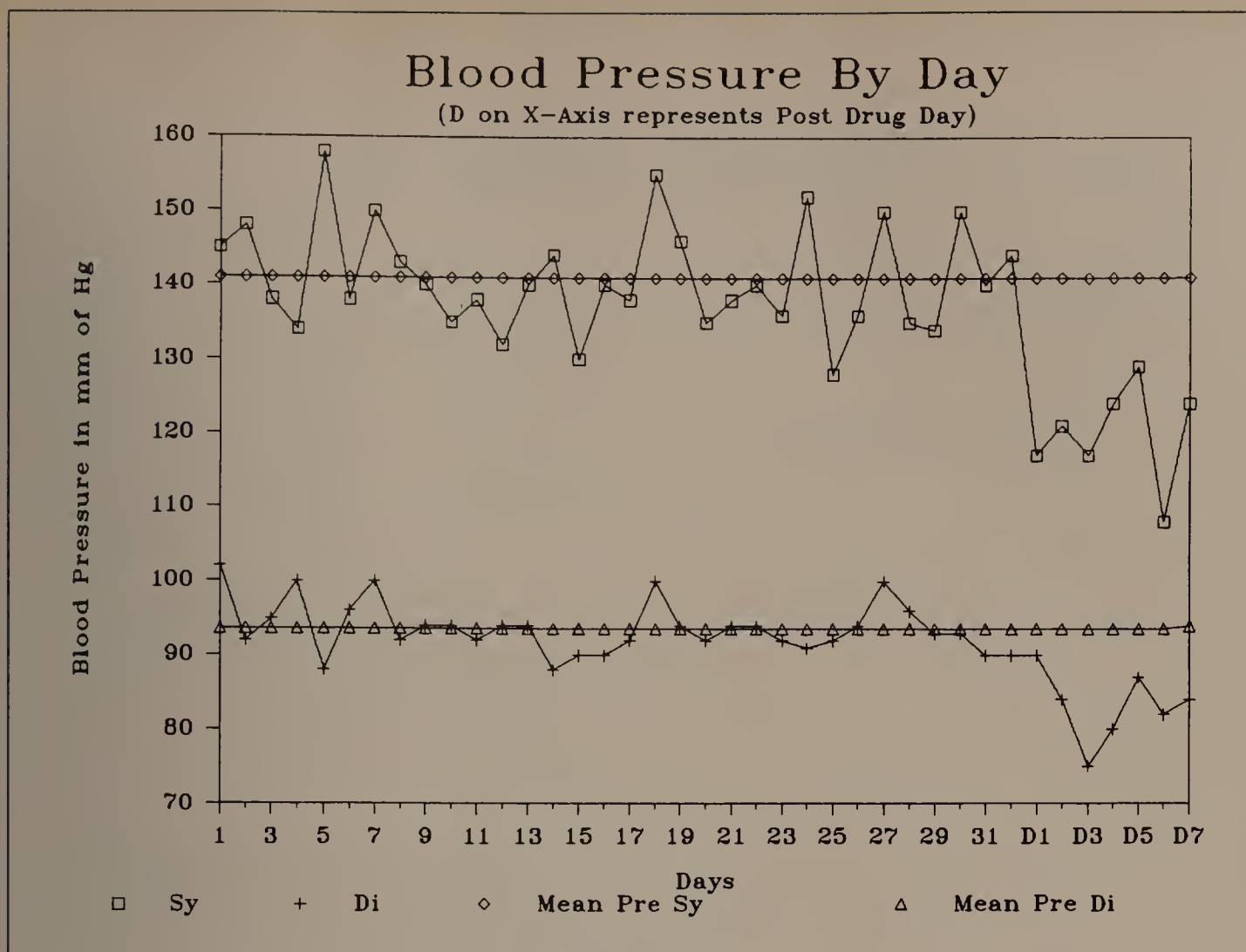


Figure 1: 1-2-3 Epson FX-80 printer output. Graph titles are highly abbreviated, and the point at which the drug was introduced is not visually apparent.

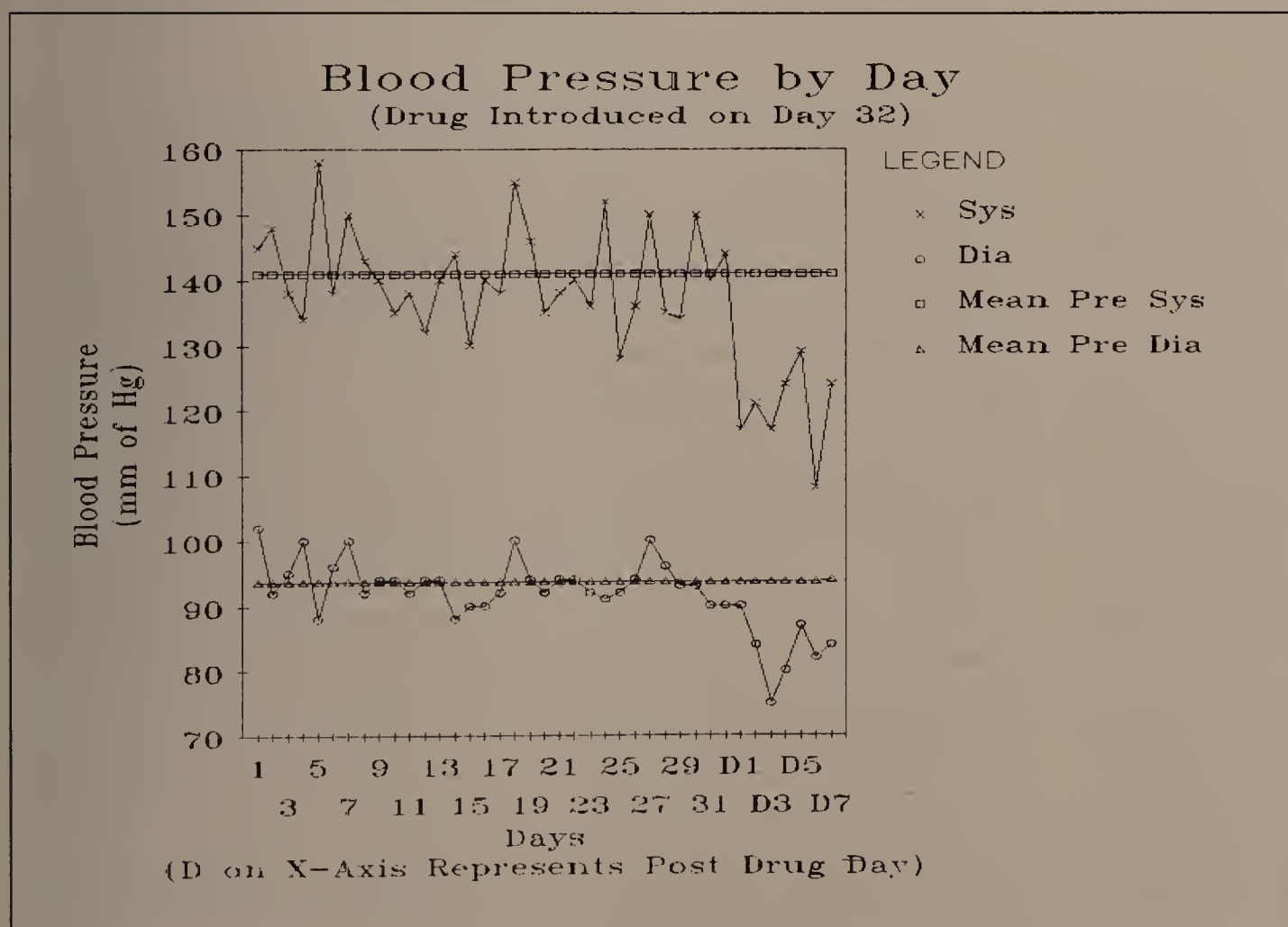
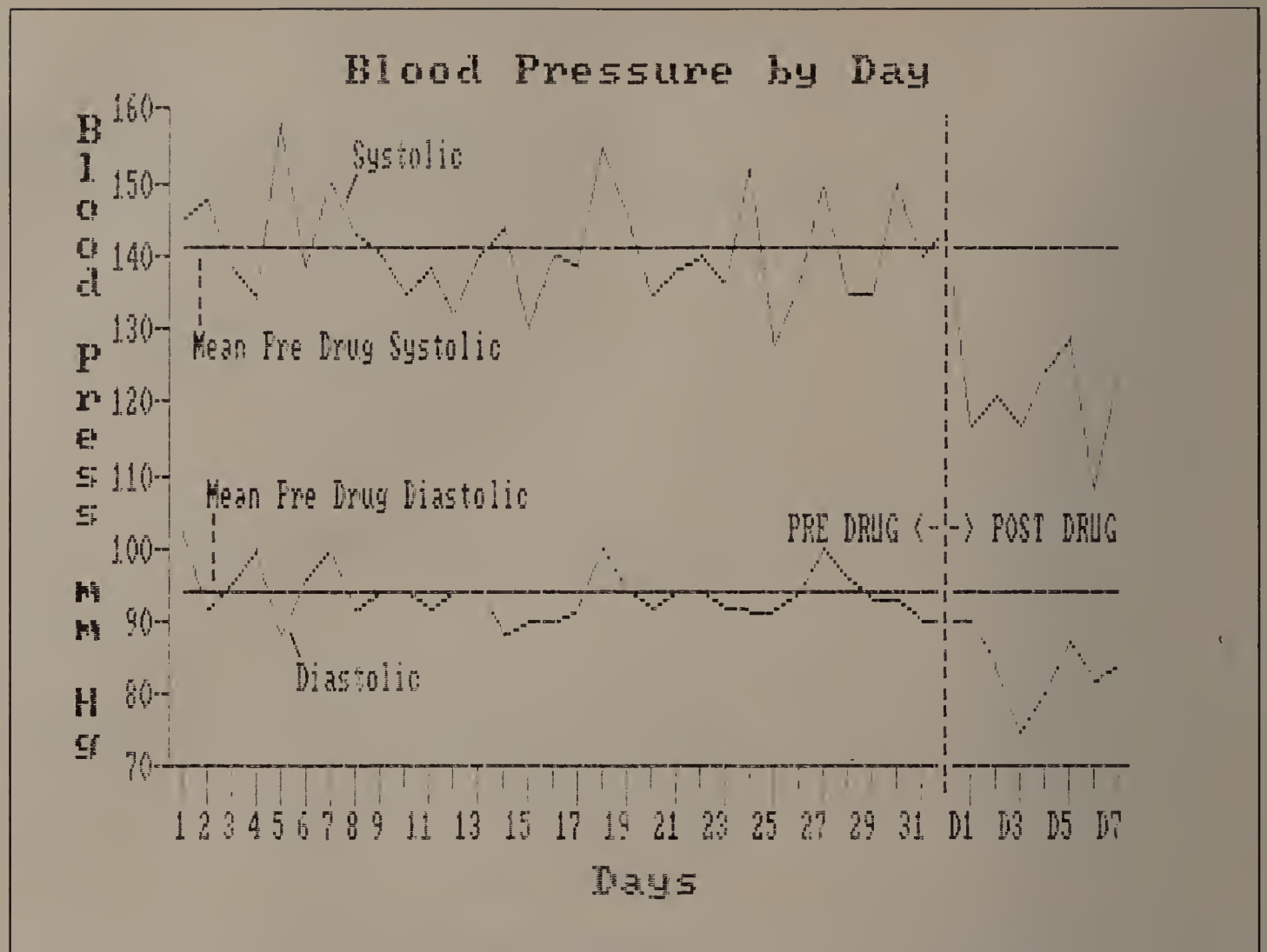


Figure 2: Chart-Master Epson FX-80 printer output. Representation of the variable titles is more clear than with 1-2-3.

Figure 3:
BPS Business
Graphics Epson
FX-80 printer
output. Legends
are spelled out
and are placed
in the relevant
locations.



to such an extent that they require additional explanation to become intelligible. Longer variable labels would have been truncated in 1-2-3's output. The point at which the drug was introduced is weakly represented and would probably have to be pointed out in an additional verbal presentation.

Figure 2, produced with *Chart-Master*, is an improvement. Taking advantage of its additional titling capabilities, *Chart-Master* can strengthen the representation of the introduction of the drug (by the title 'Drug Introduced on Day 32'). The program also improves the representation of variable labels.

Figure 3, produced by *BPS Business Graphics*, could almost stand without additional explanation. The most important increase in capacity

here is the program's ability to produce floating legends or titles. (By contrast, *Chart-Master* can only produce floating legends on plotter output.) Now the variable labels can be fully spelled out (Systolic, Diastolic, Mean Pre Drug Systolic, Mean Pre Drug Diastolic) and located on the graph so that each title points to its object. Moreover, by inventing a floating title consisting of a vertical line, the point at which the drug was introduced becomes a focal point of the figure.

Menus versus Commands

Although the capacities and features of *BPS Business Graphics* and *Chart-Master* are similar, the programs are radically different in design philosophy. *Chart-Master* is completely menu-driven, while *BPS Business Graphics* is almost completely command-driven. In spite of advertising,

hyperbole to the contrary, the difference between these modes of operation is a matter of taste rather than quality. But the usual trade-off seems to hold here: *Chart-Master* is easier for a novice to use than *BPS Business Graphics*, but the cost of this ease of use is a slight loss of power and flexibility.

Both programs can accept data from other programs easily, as long as the data is in a standardized format. As an experiment the data for Figures 2 and 3 were originally entered on a 1-2-3 worksheet, rather than with the two programs' data entry routines. You can produce a .DIF file in 1-2-3 and easily copy it over to *Chart-Master*. *Chart-Master's* carefully structured prompts and menus make the process brief and uncomplicated. *BPS Business Graphics's* data import facility requires data to be in

1-2-3	BPS Business Graphics	Chart-Master
Available Graph Types		
Line	Line	Line
Bar	Vertical bar	Clustered bar
XY	Scatterplots	Scatter chart
Pie	Pie	Pie
Stacked bar	Stacked bar	Stacked bar
—	Area	Area chart
—	Horizontal bar	Horizontal bar
—	Fitted curves	Regression
—	Combination line/bar	—
—	—	Exploded slice pie
—	—	Hi-low-close
Available Plotting Functions		
—	Exponential	Exponential
—	Line	Linear
—	Logarithm	Logarithm
—	Moving average	Traveling average
—	—	Power
—	Constant	—
—	Parabola	—
—	Sine	—
—	Smoothed moving average	—
—	Data + constant	—
—	Data - constant	—
—	Data * constant	—
—	Data / constant	—
—	Cumulative addition	—
—	Cumulative subtraction	—

Table 1: Graph types and plotting functions compared. BPS Business Graphics and Chart-Master offer substantial improvements in graph types and plotting functions compared to the analysis graphics features found in Lotus Development's 1-2-3.

ASCII format, so in order to transfer files to that program you need to create a .PRN file in 1-2-3 and send it to *BPS Business Graphics's* INTER-CHANGE program. The routine functions without surprises.

Thanks to a well-structured set of menus and prompts, the dialogue necessary to create Figure 2 with *Chart-Master* can be carried out with little thought or preplanning. Since the prompts rarely leave you guessing about the appropriate response, reading the documentation is largely unnecessary.

Although *BPS Business Graphics* is more difficult to learn, after you master the command syntax you can create comparable graphs faster than with *Chart-Master*. Unlike other

graphics programs, *BPS Business Graphics* stores data for each variable in a different file. You retrieve the data for one variable, then lay it into your graph the way you want it to appear. You then pick up the next variable, and so on. Thus, you build a graph element by element, maintaining a great deal of control over each variable.

BPS Business Graphics contains a powerful batch capability in the form of a "take file." You can save a sequence of commands and then bring the series into play with a simple command. Batch execution is particularly useful if you frequently produce similar graphs. You can implement the constant characteristics with the take file and then edit the variables and make additions before producing hard copy.

Graph Types and Functions

Table 1 compares the available graph types and plotting functions in 1-2-3, *BPS Business Graphics*, and *Chart-Master*. Unfortunately, software houses do not employ a standard terminology for graph types and mathematical functions. For example, an "XY" plot in 1-2-3 is called a "Scatterplot" in *BPS Business Graphics* and a "Scatter Chart" in *Chart-Master*. The table is arranged so that comparable functions appear on a single horizontal line.

The available graph types are roughly comparable in the two programs. Both programs improve on 1-2-3, and they both provide a selection of the most common graph

1-2-3	BPS Business Graphics	Chart-Master
—	Amdek DXY-100	—
—	Amdek Amplot II	Amdek Amplot II
—	Anadex DP9001A/9501A	—
Anadex DP9520A	Anadex DP9620A	—
—	Apple Color Plotter	Apple Color Plotter
—	Apple Dot Matrix Printer	—
—	Apple Letter Quality Printer	—
—	C. Itoh Prowriter 1550	—
—	—	C. Itoh Prowriter CX-4800
—	CalComp M84	CalComp M84
—	Centronix 122/352/353	—
—	—	Data South DS180
—	Diablo 630/1610/1620/1630	—
—	Diablo 1640/1641/1650	—
Epson FX-80	Epson FX-80	Epson FX-80
—	—	Epson FX-100
Epson MX-80/MX-100	Epson MX-80/MX-100	Epson MX-80/MX-100
—	Hewlett-Packard HP7220	Hewlett-Packard HP7220B/C/S/T
—	Hewlett-Packard HP7221	Hewlett-Packard HP7221B/C/S/T
—	Hewlett-Packard HP7225	Hewlett-Packard HP7225/17603/17604
Hewlett-Packard HP7470A	Hewlett-Packard HP7470A	Hewlett-Packard HP7470A-Option 001
—	Hewlett-Packard HP7475A	Hewlett-Packard HP7475A
—	—	Hewlett-Packard 7550 Plotter
—	—	Hitachi 671-10/671-20
—	—	Houston Instrument DMP29/DMP40/DMP41
—	IBM 80cps	—
IBM Graphics	IBM Graphics	IBM Graphics
—	IBM XY-749/XY-750	IBM XY-749/XY-750
—	IDS 440G/445G	—
—	—	IBM 7371 Plotter
—	—	IBM 7372 Plotter
—	IDS Prism 80/Prism 132	IDS Prism 80/Prism 132
—	IDS Microprism	—
—	Mannesmann Talley MT160/PIXY1	—
—	Mannesmann Talley PIXY3	Mannesmann Talley PIXY3
—	NEC 3510/3550	—
NEC 8023	—	—
Okidata 82A/83A	Okidata 82A/83A	—
—	Okidata 92/93	—
—	Panasonic VP-6801	Panasonic VP-6801
—	—	Panasonic VP-6802
—	—	Polaroid Palette
—	Qume Sprint 5-45/5-55	—
—	—	Roland DXY-800
—	—	Six-Shooter
—	Strobe 100	Strobe 100
—	—	Strobe 200/260
—	Sweet-P 100	Sweet-P 100
—	Watanabe WX4633/WX4634	—
—	Watanabe WX4635/WX4636	—
—	Watanabe WX4637/WX4638	—
—	Watanabe WX4671/WX4675	—
—	Xerox 1710/1720/1730	—
—	Xerox 1740/1741/1750	—
—	—	Yokogawa PL-1000/PL-2000

Table 2: Output device support compared. When you use presentation graphics packages, the quality of the printer and plotter can make all the difference.

types. None of the programs approaches the state of the art in contemporary graphic representation found on minicomputers and mainframes (for example, in the statistical program *MINITAB*), but the stock of graph types is probably sufficient for most business purposes.

BPS Business Graphics is slightly richer than *Chart-Master* in its ability to fit curves and to generate functions. In both programs these features are easy to use but relatively

BPS Business Graphics stores data for each variable in a different file.

inflexible. You would have difficulty, for example, developing a curve based on a subset of values of a variable: the functions must be based on all the data for a variable. The Mean Pre Drug curves in Figures 1, 2, and 3 are examples of applications for which this capacity is desirable. These averages had to be created in the 1-2-3 spreadsheet and then transported into the graphics programs.

Table 2 shows that the two graphics programs support a tremendous variety of output devices. While version 1A of 1-2-3 supports 9 printers and plotters, *Chart-Master* supports over 40 and *BPS Business Graphics* supports over 60.

Figures 1, 2, and 3 were all produced on an Epson FX-80. The 1-2-3 printout (Figure 1) was produced using the printer's quad-density mode. The *Chart-Master* and *BPS Business Graphics* printouts (Figures 2 and 3) were generated by reproducing the high-resolution graphics screen image. These figures represent the best dot matrix print quality possible with each program.

Say goodbye to the Tower of Babel with...

XENO-DISK™

The disk production system for your PC!

Read, write, format and duplicate 70 disk formats on your IBM-PC or compatible under MS-DOS. Developed from our popular Xeno-Copy™ utilities. Now supports popular 8" and 96 TPI formats. XENO-DISK..... \$379.50

Also available:

- XENO COPY™ \$99.50
Read and transfer 70 formats to PC/MS-DOS (one way transfer)
- XENO-COPY PLUS™ \$149.50
Read and write 70 formats (bi-directional file transfer)
- ADVANCED™ Option add \$50.00
Supports 8", 96 TPI, parameter input for other formats. Included in XENO-DISK.

RUN CP/M-80 PROGRAMS ON YOUR PC . . . \$99.50!

80MATE™, our CP/M emulator, will run almost any CP/M-80 program under MS-DOS. No need for expensive co-processor boards!

See your dealer or call for information.



Dept. W, 7950 W. Fourth Street
Los Angeles, CA 90048
(213) 938-0857



Circle 194 on reader service card

STATE OF THE ART ART

"Hard to imagine having an IBM without '4-Point;' it's a necessity."

Bob Schwabach

"Can create anything from traditional business graphics (and) company logos . . . to animated computer movies and computer art . . ."

Software News

"Very impressive program . . . amazingly well designed . . . manual is one of the best . . ."

Microcomputing



4-POINT GRAPHICS
A revolution in design

4-POINT GRAPHICS is the most creative presentation graphics program you can buy. You can even interface with other software like Lotus 1-2-3 to jazz up their charts and graphs.

"Unique design possibilities . . . able to use a variety of input/output devices . . . (price) is well justified . . ."

PC Magazine

The 4-point system is amazingly flexible. But don't take our word for it. Sell yourself at a leading software store in your area.



INTERNATIONAL MICROCOMPUTER SOFTWARE, INC.
633 Fifth Avenue San Rafael, CA 94901
415/454-7101

Circle 530 on reader service card

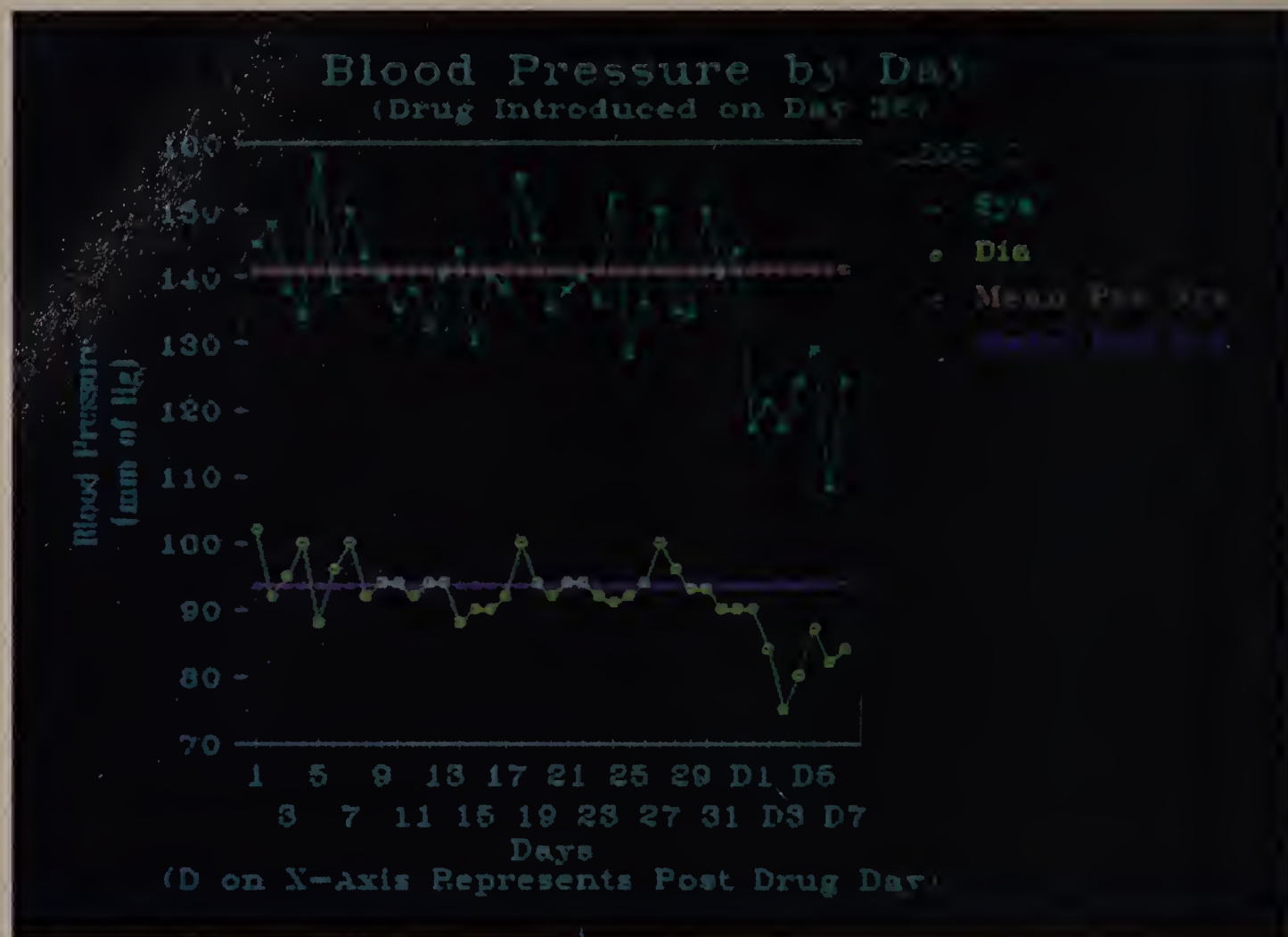


Figure 4:
Chart-Master
chart shown on
a slide generated
by the Polaroid
Palette

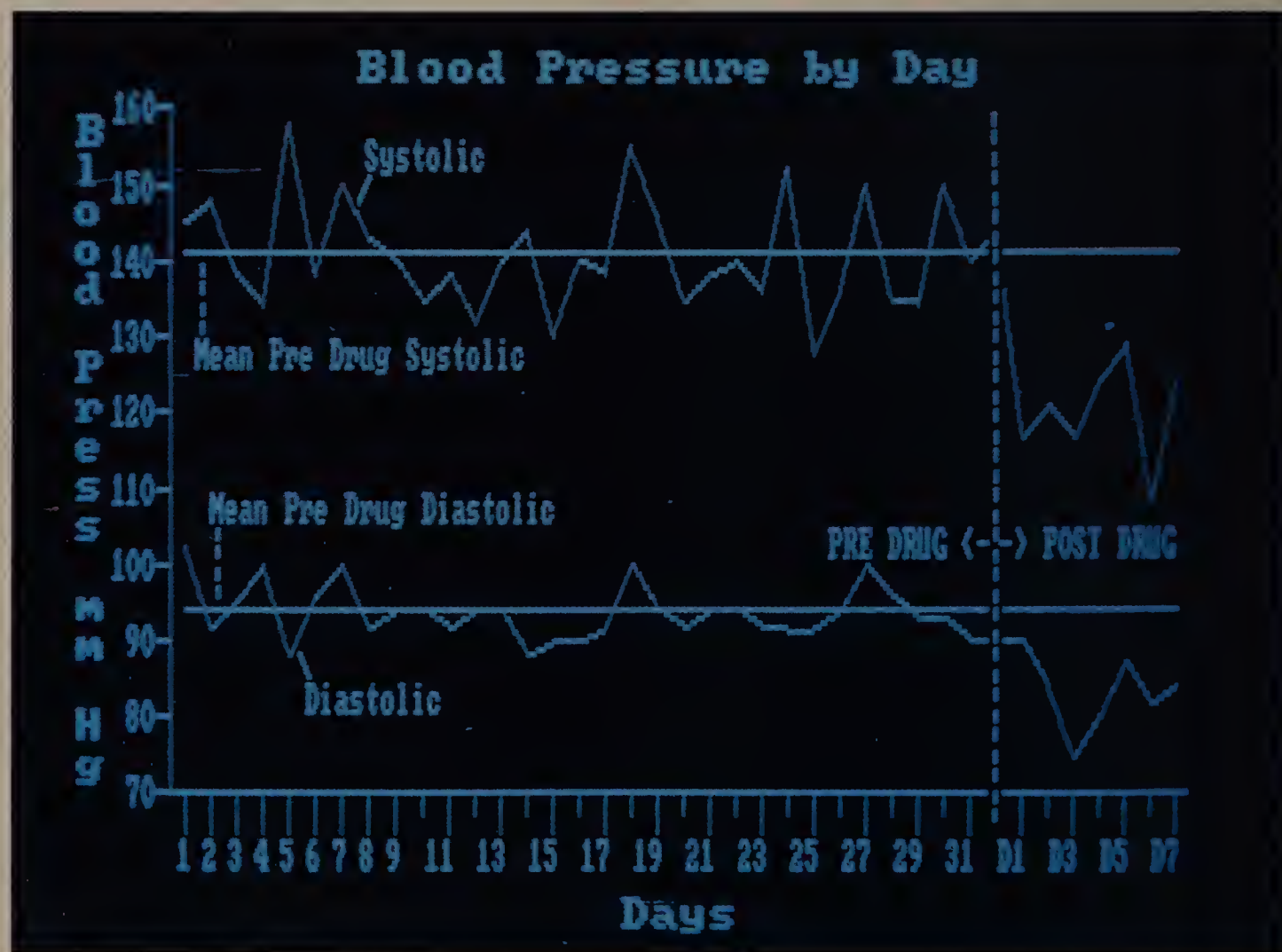


Figure 5:
BPS Business
Graphics chart
shown on a slide
generated by the
Polaroid Palette

1-2-3 generated the highest-quality printout on the Epson. The *Chart-Master* printout was marginally acceptable, and the *BPS Business Graphics* printout was too crude to serve as anything but a guide for a draftsman; the characters are poorly formed, and the lines and curves are ragged. Given the quality of the 1-2-3 plot, it is obvious that the problem does not lie with the printer but with how the printer is supported by the program.

Figures 4 and 5 show the same charts as Figures 2 and 3, but they are saved as slides with the Polaroid

BPS Business Graphics
contains a powerful
batch capability.

Palette instead of printed on an Epson FX-80. The slides show an improvement in quality. You may need to use a slide generator or a plotter to produce presentation graphics of acceptable quality. Before you choose a package, you should insist on a demonstration using your particular output device.

In summary, both graphics programs are superior to 1-2-3 in creating presentation graphics. *Chart-Master* has the edge in ease of use for the novice. Its menu-driven operation is straightforward and there is little need for supplementary documentation. *BPS Business Graphics* has

more power and flexibility; the implementation of floating titles and legends is particularly notable, and the program provides more plotting functions. Either program is worthy of consideration as a supplement to 1-2-3 if you do not intend to produce your final output on a dot matrix printer. ●

Burton L. Alperson, Ph.D., is a Contributing Editor to PC World.

*BPS Business Graphics
Business & Professional Software,
Inc.
143 Binney St.
Cambridge, MA 02142
800/342-5277
List price: \$350
Requirements: 128K, two disk drives,
color graphics board, color
monitor*

*Chart-Master
Decision Resources
25 Sylvan Rd. S
Westport, CT 06880
203/222-1974
List price: \$375
Requirements: 192K (256K for printing
graphics or for use with the Polaroid
Palette), two disk drives,
color graphics board with color
monitor or Hercules board with
monochrome monitor*

FAST SIDEWAYS PRINTING FOR YOUR EPSON

Now you can print multi-page **spreadsheets** or reports as wide as you like on your FX printer, **sideways** on your paper, in a choice of five different type sizes, at **full text-mode speed**. And you can print in super-fast two-pass dot-matrix **letter quality**. Or create a printer buffer of up to 32K.

Printer Boss™ software also allows full menu-based operation of all control functions of all of the Epson MX, FX and RX printers. **Select** and de-select pica, elite, compressed, italic, enlarged, emphasized, doublestrike, underline, superscript and subscript. **Set** line spacing, right and left margins and skip-over-perforation. **Load** USA, France, Germany, England, Denmark, Sweden, Italy, Spain and Japan language sets. **Control** unidirectional, half-speed and proportionally-spaced printing. **Store and retrieve** 10 complete menu settings with a few keystrokes. **Emulate** the IBM-label printer for the IBM-PC, eliminating character printout incompatibilities between IBM-PC software and Epson FX printers while retaining full printer versatility. **Download** to FX printers five different **IBM character sets**, including graphics symbols, greek symbols, screen and APL characters. Print at full text-mode speed. **Ideal** for **IBM graphics** software, or **screen dumps**, or printing text from **Wordstar**, **Lotus 123** or many other fine programs.

Printer Boss™ for the IBM-PC and compatibles \$59.95. With Letter Boss™ letter quality or Sidekick™ sideways print option \$99.95. With both \$139.95. Visa, MC, or send check. Free info. Dealers welcome.

Printer Boss™

CONNECTICUT SOFTWARE
30 WILSON AVENUE
ROWAYTON CT 06853
203-838-1844

SIDEKICK IS NOT TO BE CONFUSED WITH SIDEWAYS. A TRADEMARK OF FUNK SOFTWARE. PRINTER BOSS, LETTER BOSS AND SIDEKICK ARE TRADEMARKS OF SPEER RESEARCH CORPORATION. WORDSTAR AND LOTUS 123 ARE TRADEMARKS OF MICROPRO INT'L CORP AND LOTUS DEVELOPMENT CORP RESPECTIVELY.

Circle 758 on reader service card

**THERE'S ONLY ONE PC/XT
MODEM DESIGNED TO
LET BOTH YOU
AND YOUR
COMPUTER
TALK.**

"That's it—just one?"



**ON THE
SAME LINE.**

Only the PC: IntelliModem™ lets you switch repeatedly between voice and data communications.

Any old modem will let computers talk. But to move from talking or listening to sending and receiving data—at the touch of a single button—there's only one modem that's smart enough. The 1200-baud PC: IntelliModem from Bizcomp.

Let's say you want to transfer some files, and you want to talk to the person receiving them, both before and after the transfer. With other modems, you'd have to hang up, re-dial, or plug and unplug a bunch of cables. Not very convenient, especially if you use your phone a lot, and you have only one line.

With the PC: IntelliModem, you just plug your regular handset into the back of your IBM PC/XT. That's it. You're now ready to make connections with computers—and people—much faster and more conveniently. It's like getting a modem *and* a telephone for the price of a modem alone.

The ultimate status seeker.

The PC: IntelliModem also monitors your telephone line's status more closely than other modems. It listens to the line much like you do, and detects signals for dial tone, ringing, busy and voice—some of which other modems completely ignore. It then automatically takes the

Make sure your modem has all these PC: IntelliModem features

Integrated Voice/Data

- Switch between voice and data communications
- Programmable telephone handset jack

Status Reporting

- Line status detection (dial tone, busy, ringing, voice answer, modem answer, incoming call)
- Audio monitor
- Programmable LED

PC: IntelliCom Software Included

- 99-name on-line telephone directory
- Auto-dial, auto-repeat dial, auto-answer
- Link to another number if busy
- File transfer
- Data capture to diskette
- Programmable auto log-on sequences

Compatible with Crosstalk™/PC-Talk III™

Receive Sensitivity: -50 dBm

Speeds: 110, 300, 1200 baud

appropriate action, so there's less chance of error in making a connection. And since the PC: IntelliModem gives *you* a constant indication of what's going on, you always know how your call is progressing.

A soft touch to operate.

Included with our single plug-in modem board is PC: IntelliCom™, our exceptionally easy-to-use software package. It guides you step by step during use, through on-screen menus, entry instructions, an

audible buzzer and a handy HELP key. There's even a demonstration program that runs through the main features.

All software tasks are activated by pressing function keys, which are clearly labeled on the screen. That means you can go from talking to someone, to transferring data, and back to talking again—all with single keystrokes.

The one that's out of sight.

Even though the PC: IntelliModem is hidden inside your PC or XT, you should see how it works. So go to your dealer and ask for a demo. Also ask about our 2-year warranty, free NewsNet™ connect time and our modest \$499 price.



Or contact:
Bizcomp,
532 Mercury Drive,
Sunnyvale, CA 94086;
408/733-7800.

You'll find there's only one modem that does it all, including voice communications: the PC: IntelliModem.

PC: IntelliModem and PC: IntelliCom are trademarks of Business Computer Corporation. IBM is a trademark of International Business Machines Corporation. Crosstalk is a registered trademark of Microstuf Inc. PC-Talk III is a registered trademark of The Headlands Press Inc.

Circle 24 on reader service card

BIZCOMP®

We've got people talking.

Lease Vs Purchase Analyzer

IS YOUR VENDOR TELLING YOU THE TRUTH? Should you purchase? Should you lease? L V P ANALYZER shows you the least cost method of equipment acquisition.

VENDOR A
JUNE 1, 1984

CASHFLOW

YEAR 1	1984	1984	1984	1984	1984	1984	1984	1985	1985	1985	1985	1985	TOTAL
MONTH	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	YEAR 1
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	YEAR 1
MONTHLY PYMT	1037.54												
PRINCIPAL	543.54	549.43	555.38	561.40	567.48	573.63	579.84	586.12	592.47	598.89	605.38	611.94	6925.49
INTEREST	494.00	488.11	482.16	476.14	470.06	463.91	457.70	451.42	445.07	438.65	432.16	425.60	5524.99
INSURANCE	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	720.00
MAINTENANCE	0.00												
SALES TAX	3398.50												
PROPERTY TAX	60.00												
DEPRECIATION	570.00												
RESIDUAL VALUE	0.00												
INSTALLATION	490.00												
DOWN PAYMENT	2400.00												
I T C	4800.00												
TOTAL OUTFLOW	7446.04												
TAX SAVINGS	8536.25												
AFTER TAX OUTFLOW	-1090.21												
PRESENT VALUE EFFECT	-1081.20												

YEAR 3
1986
JUNE
MONTH
25

MONTHLY PYMT
1037.54

PRINCIPAL
703.95

INTEREST
333.59

INSURANCE
60.00

MAINTENANCE
250.00

SALES TAX
21.70

PROPERTY TAX
60.00

DEPRECIATION
798.00

RESIDUAL VALUE
0.00

TOTAL OUTFLOW
1429.24

TAX SAVINGS
761.65

AFTER TAX OUTFLOW
667.59

PRESENT VALUE EFFECT
542.51

LEASE VS PURCHASE ANALYZER

INPUT DATA

DISCOUNT INTEREST RATE 10.00 I

LOAN INTEREST RATE 13.00 I

FEDERAL INCOME TAX 46.00 I

STATE INCOME TAX 3.00 I

CITY/CNTY INCOME TAX 1.00 I

PERSONAL PROPERTY TAX 1.50 I

STATE SALES TAX 7.00 I

RESIDUAL VALUE 15.00 I

DOWN PAYMENT 5.00 I

INSURANCE 1.00 I

LOAN TERM 60 MONTHS

LEASE TERM 36 MONTHS

CONVERSION POINT 0 MONTHS

ASSET LIFE 60 MONTHS

WARRANTY PERIOD 3 MONTHS

ACCRUAL LIMIT 40.00 I

PURCHASE ACCRUALS 40.00 I

PURCHASE ITC (10/8/0) 10.00 I

LEASE ITC (10/8/0) 0.00 I

CAPITALIZE SALES TAX (Y=1,N=0) 0

PERIOD BEGIN (1) END (1) 1

APPLY MAINT TO LEASE (Y=1,N=0) 1

COMPANY NAME VENDOR A

DATE JUNE 1, 1984

SOFTWARE SERVICES OF TAMPA, INC.

PURCHASE CASE

ORIGINAL PURCHASE PRICE 48,000.00

NET PURCHASE PRICE 48,000.00

AMOUNT FINANCED 45,600.00

PURCHASE ACCRUALS I 0.00

DEPRECIATION

YEAR 1 3,241.73

YEAR 2 4,303.87

YEAR 3 3,718.85

YEAR 4 3,366.33

YEAR 5 2,047.25

YEAR 6 0.00

YEAR 7 0.00

TOTAL DEPRECIATION 17,678.02

PRESENT VALUE

AFTER TAX

PURCHASE PRICE (+) 34,825.96

INTEREST EXPENSE (+) 7,002.12

DOWN PAYMENT (+) 2,380.17

PROPERTY TAX (+) 1,411.96

MAINTENANCE (+) 5,514.34

INSTALLATION (+) 242.98

SALES TAX (+) 1,922.10

INSURANCE (+) 941.31

DEPRECIATION (-) 17,678.02

I T C (-) 4,760.33

RESIDUAL VALUE (-) 2,188.04

NET PURCHASE 29,616.54

LEASE CASE

36 MONTHS

ORIGINAL LEASE TERM

CONVERT AT 0 MONTHS FOR

0 Mo's EXT 12 Mo's EXT 24 Mo's EXT

0% DSCNT 5% DSCNT 20% DSCNT

LEASE STREAM 27,117.33 34,130.52 38,369.22

ITC VALUE 0.00 0.00 0.00

MAINTENANCE 3,505.07 4,559.68 5,514.34

INSTALLATION 242.98 242.98 242.98

SALES TAX 1,080.29 1,362.66 1,544.43

INSURANCE 619.82 788.56 941.31

PROPERTY TAX 929.74 1,182.84 1,411.96

NET LEASE 33,495.22 42,267.25 48,024.23

NET PURCHASE 29,616.54 29,616.54 29,616.54

PURCHASE ADVANTAGE 3,878.69 12,650.72 18,407.70

SAVINGS I 8.08 26.36 38.35

What are the REAL COSTS of the monthly payments in TODAY'S DOLLARS?

What are the effects of FEDERAL, STATE and CITY INCOME TAXES?

What are the BOTTOM LINE effects of ITC, WARRANTY PERIODS, and PERSONAL PROPERTY TAX?

Have you considered the EFFECT of RESIDUAL VALUES? STATE SALES TAX? DOWN PAYMENTS?

What effect will LEASE EXTENSIONS or RENEWALS have on the purchase alternative?

How do DISCOUNTS on LEASE EXTENSIONS or RENEWALS affect your decision?

If you are on lease, SHOULD YOU REMAIN ON LEASE? SHOULD YOU PURCHASE? What affect do PURCHASE ACCRUALS have on your decision?

What affect does the ASSET LIFE have on the COST OF OWNERSHIP?

You simply fill in the "blanks" and L V P tells you the answers in clear concise terms.

L V P ANALYZER provides total dollar outflow by category, month and year. Tax savings and net cash outflow are provided for each period in the analysis. The net cash outflows (or inflows) are evaluated in present value terms to show you their real cost or savings in today's dollars.

LVP ANALYZER provides you the tool to do "what if" analysis. This enables you to evaluate the acquisition alternatives under various conditions.

Can you afford to select less than the best acquisition alternative? L V P ANALYZER can pay for itself many times over the first time you use it!

L V P ANALYZER runs on the IBM-PC* under multiplan by Microsoft**

*IBM-PC is a trademark of IBM Corporation.
**Multiplan is a trademark of Microsoft Corporation.

Copyright 1984 by Software Services of Tampa, Inc., all rights reserved.



SOFTWARE
SERVICES OF TAMPA

Send your check for \$195.00 to: Software Services of Tampa
4410 Ranchwood Lane • Tampa, FL 33624 • (813) 273-1894

Now available in lot 100

\$195

What's the best recommendation you can make when you're asked about business graphics?

The New Business Professional Plotter from Hewlett-Packard — The 6-Pen HP 7475A

Today, business professionals are becoming more aware of the vital importance of business graphics to their success. Tomorrow, they may be asking for your recommendation. Here's some important information that will help you. Tell them...

Make a first impression that lasts

Truly impressive graphic presentations can create a first impression of quality and professionalism that lasts and lasts. The way you present your information can be equally as important as the information you're presenting. And that's where the new HP 7475A Business Professional Plotter lets your professionalism shine through.

Standards unsurpassed in the plotter business

The technical standards of the HP 7475A have no equal for producing quality graphics. With a resolution of one-thousandth-of-an-inch, curved lines are smooth, not jagged, and straight lines are *consistently* straight. Its exceptional repeatability (the ability of a pen to return *precisely* to a given point), assures that intersecting lines and circular shapes will meet *exactly*.

Compatible with almost any personal computer in your office and supported on today's most popular graphics software packages

The HP 7475A quickly "makes friends" with most of the personal computers you may already have in your office, including IBM®, Apple™, Compaq™, Osborne®, and Commodore™—as well as a host of HP computers. You even have a choice of many off-the-shelf software packages that give you "first-day" productivity with the HP 7475A.

Your Choice: 2 media sizes

While most professional business applications will be satisfied with standard 8½ x 11" paper or transparencies, the HP 7475A adds the capability of plotting on larger 11 x 17" media, too.

The cost? Surprisingly affordable

The new HP 7475A Business Professional Plotter is an amazingly affordable \$1895. When you consider the high cost of having your graphics prepared by an outside service, you'll find the return on your investment is almost immediate.

Another choice: HP's low-cost, high performance Personal Computer Plotter

For the "business on a budget," you may also want a look at our 2-pen Personal Computer Plotter, the HP 7470A. Its low-cost (only \$1095) is as remarkable as the quality of its plots. With many of the same features as the new HP 7475A, the HP 7470A plots on media up to 8½ x 11." It stores and caps two-pens, and you can easily change the pens for multi-color plotting.

Send for your FREE "Better Presentations Package" today!

For a FREE sample plot, overhead transparency, and more details, mail the coupon below. We'll also enclose a list of software packages you can use right "off-the-shelf."

For the name of your nearest Hewlett-Packard dealer call toll-free 800-FOR-HPPC.

1101304



YES! I want to make the most informed business graphics recommendation I can. Please send me your FREE "Better Presentation Package," so I can learn more about the new HP 7475A Business Professional Plotter and the HP 7470A Personal Computer Plotter. I understand I will receive this valuable package without cost or obligation.

Name _____ Title _____

Company _____

Address _____

City, State & Zip _____

Phone Number () _____

My computer is _____

Send to: Hewlett-Packard, 16399 W. Bernardo Drive,
San Diego, CA 92127
Attn: Marketing Communications

11304 PW6

Chart-Master™ turns volumes of complex data into easy-to-understand graphics.



"A picture is worth a thousand words." With this simple concept as a building block, Chart-Master is changing the way busy executives, analysts and secretaries look at, interpret and present information. In a fraction of the time required to wade through volumes of printouts, you can

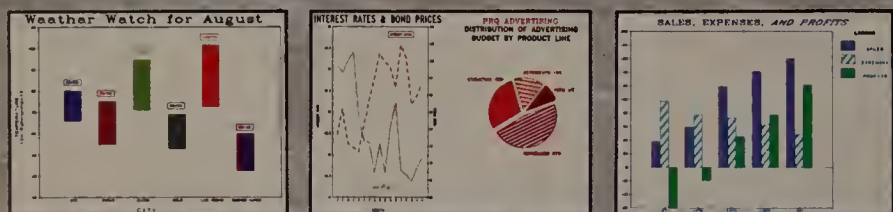
you can transfer your selection to paper or acetate transparencies for a colorful, presentation-quality chart in seconds.

Chart-Master presents a *clear picture* of the "bottom line," which conveyors of information understand and decision makers appreciate. That's why major corporations like GE, Eastman Kodak, Exxon, Union Carbide, GM, AT&T, DuPont, 3M, Citibank, Motorola, Procter & Gamble, and GTE rely on Chart-Master to translate "volumes of complex data into meaningful information."

Chart-Master supports the IBM Instruments XY750, Panasonic VP Series, Houston Instruments DMP29, Yokogawa PL1000 and Strobe plotters, in addition to the Hewlett-Packard family of plotters, for use with IBM PC and other compatible computers.

The retail price of Chart-Master is \$375. For a complete information kit and name of your nearest dealer, contact Decision Resources, Inc., 25 Sylvan Road S., Westport, CT 06880. (203) 222-1974.

DecisionResources
Software Designed for Decision Makers



Values printed at data points; both left and right Y-axis scales; floating legends & bars; both horizontal & vertical formats; exploded pie sections.

produce easy-to-understand bar charts, pie charts and scatter diagrams quickly and dramatically. Chart-Master makes it easy to customize reports and presentations with six different fonts, label placement, proportional pie charts and more.

Menu-driven Chart-Master allows you to enter data and select a chart format at the press of a button. You then preview your selection on your personal computer screen as it would appear in final form. Or, you can review the various Chart-Master graphic options to make sure you have selected the most effective format. When satisfied,



Introducing CompuServe's Executive Information Service

To Help the Over-Achiever Handle the Overload.

YOU,
YOUR IBM™ PC,
AND COMPUERVE,
MAKING
EXECUTIVE DECISIONS
TOGETHER.

If you're tired of having your answers questioned or waiting to have your questions answered, here's on-line support for you and your IBM™ PC, from the same communications professionals who provide business information services to over one fourth of the FORTUNE 500 companies.

CompuServe has more of the services and specific information that you need. For state of the art communications, you get InfoPlex™, the easy to use electronic mail service, and E-COM™ to link your PC to the U.S. Postal Service for quick, inexpensive hard copy delivery. For in-depth financial data, there's Value Line, Standard and Poor's, and up-to-the-minute quotes plus current and historical information on over 50,000 companies and issues. Site-Potential™ is a demographic database that gives detailed census information and sales potential projections for any area of the country you choose.

The Executive News Service brings you the impressive resources of the Associated Press wire services along with a unique clipping capability that automatically selects articles on topics of your choice and stores them for your own "file."

There are professional forums, bulletin boards, the Official Airline Guide Electronic Edition, an on-line travel agency, and listings of airport delays.

And the new CompuServe software especially for the IBM PC makes this the simplest, most time efficient on-line service ever for the busy executive.

So, decide now to inquire about CompuServe's Executive Information Service. It makes every other decision a lot easier.

To get your CompuServe Executive Information Service Inquiry Kit, contact or call:



CompuServe

Executive Information Service
P.O. Box 20212
5000 Arlington Centre Blvd.
Columbus, Ohio 43220

800-848-8199
In Ohio, call 614-457-0802

You're traveling through 140°



terrain at 300 rpm.

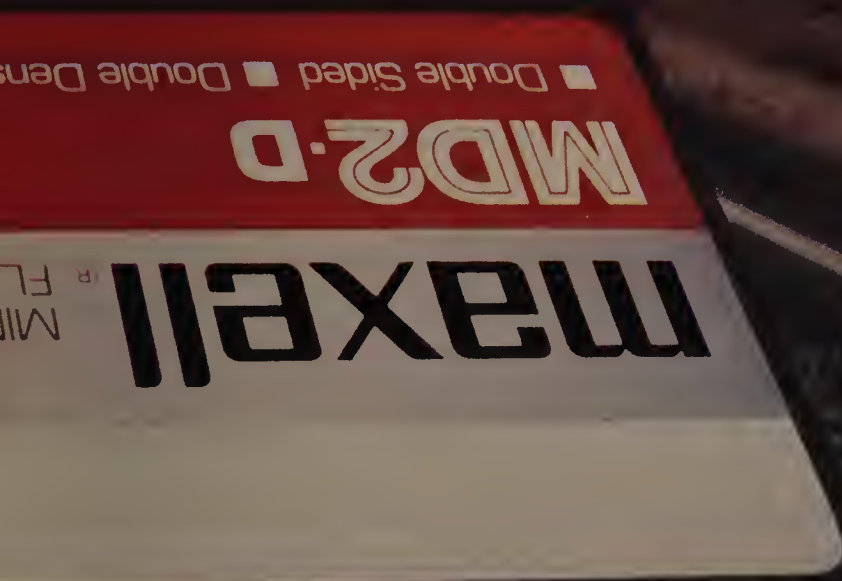
While some disks lose their way in the torrid zone of drive heat, Maxell guarantees safe passage.

A lifetime warranty. And manufacturing standards that make it almost unnecessary. Today and in the long run, you'll be glad you chose Maxell.

Consider this: Every time you take your disk for a little spin, you expose it to hazardous drive conditions. Temperature build-up can sidetrack data. Worse, take it to the point of no return. Maxell's Gold Standard jacket construction defies heat of 140°F. And keeps your information on track.

And Maxell runs clean. A unique process impregnates lubricants throughout the oxide layer. Extending media and head life. How good is Gold? Maxell's the disk that many drive manufacturers trust to put new equipment through its paces. It's that bug-free.

So you can drive a bargain. But in accelerated tests, Maxell was an industry leader in error-free performance and durability. Proving that if you can't stand the heat you don't stand a chance.



maxell®

IT'S WORTH IT.

Maxell Corporation of America
60 Oxford Drive, Moonachie, N.J. 07074
201-440-8020

Circle 578 on reader service card

More Color Than Big Blue

Two new graphics boards for the PC that beat IBM at its own game

David McCune

IBM did not make it easy for the businessperson to produce graphics on the IBM PC. One of the most popular PC video options, the IBM Monochrome Display, is best suited for processing text and numbers. The Monochrome Display is driven by the Monochrome Display Adapter—a circuit board that plugs into one of the PC's expansion slots. The two together produce extremely sharp, flicker-free green characters on a black background, 80 characters wide by 25 lines long. As an extra bonus, the monochrome board includes a built-in parallel printer port. Although the monochrome monitor and monochrome display board are a superior combination, they cannot produce color, and their smallest graphic elements are fat, mosaic-like rectangles and lines. A pie chart drawn with these graphic elements ends up looking like it is made of bricks.

Of course, you are not obliged to buy the monochrome monitor and board; IBM sells a color graphics board (without a parallel port) and a color monitor. With these you can

create color charts and other graphics and use two different screen resolutions. Resolution refers to the number of pixels (picture elements) that make up the images on the display. The smaller and more densely packed the pixels, the higher the resolution and the smoother the lines and characters appear.

The text displayed by the IBM Color/Graphics Adapter and monitor is a boon only to opticians.

Most business graphics packages work in medium resolution (320 by 200 pixels) and can use four colors at the same time. The background color is chosen from a predefined set of 16 colors; the three foreground colors can be either green, red, and brown or cyan, magenta, and white. If you want to create your own color, such as orange, you're out of luck. In high-resolution mode (640 by 200 pixels) you can draw much smoother

circles and diagonal lines—but only in black and white. Computer-aided designers often need high resolution for drafting, but they must sacrifice all color capability. The IBM Color/Graphics Adapter does have a 100-by-160-pixel, low-resolution mode with 16 simultaneous colors, but it is not well implemented by IBM and is seldom used.

The disadvantages of the IBM Color/Graphics Adapter are considerable. The text displayed by the board and monitor is a boon only to opticians. The characters are lit in an 8-by-8-pixel matrix, compared to the 9 by 14 matrix of the monochrome adapter, and are accordingly fat and fuzzy. When the screen scrolls, it quickly flashes off and on, producing an annoying flicker.

The board's cost can be a problem, too. The Color/Graphics Adapter's lack of a parallel port may eventually force you to buy a separate board for this function, and the Color/Graphics Adapter requires an expensive RGB color monitor. (RGB stands for red, green, and blue and refers to the way the board and monitor encode and decode color information.) The IBM Color/Graphics Adapter also has a

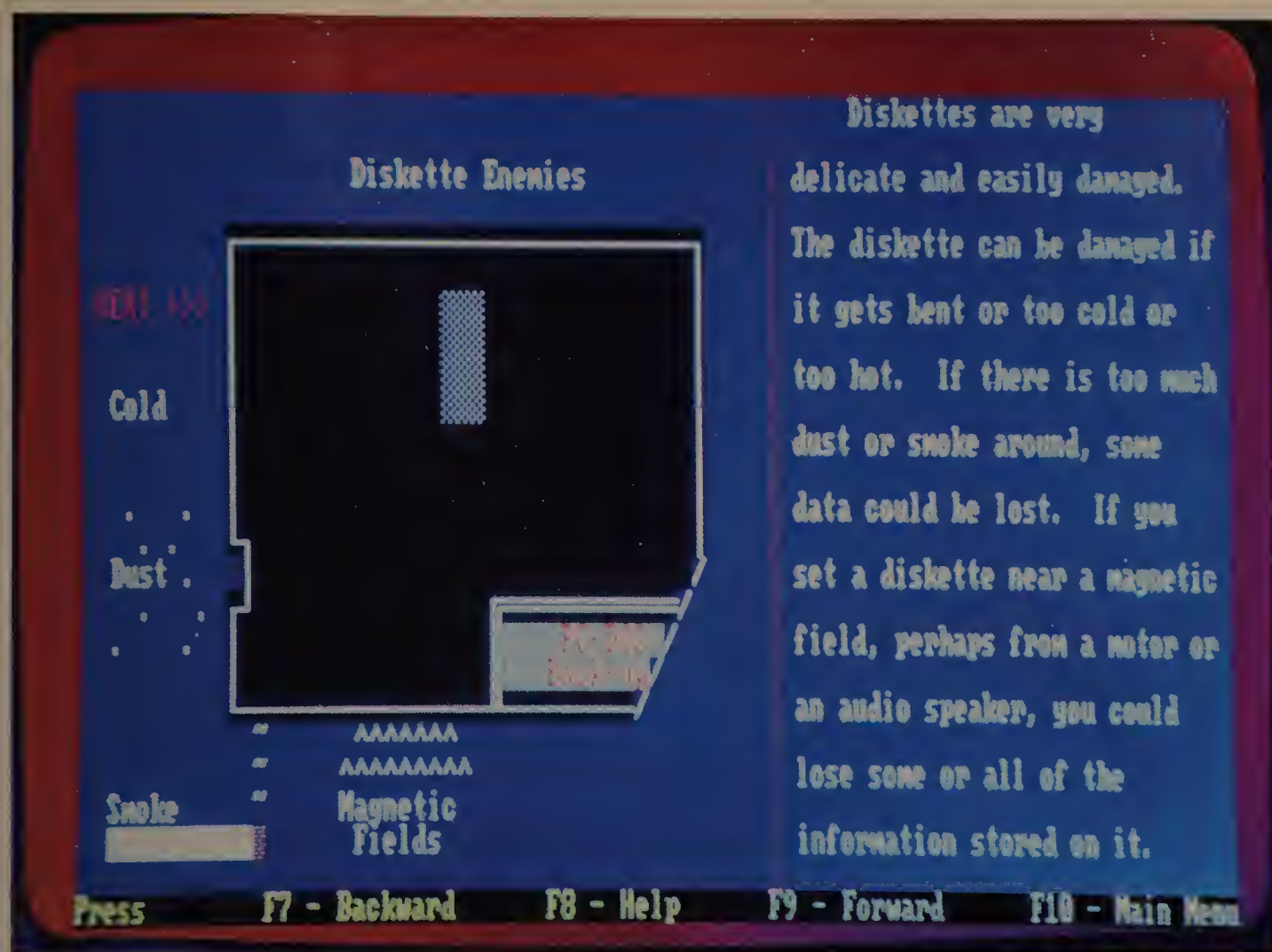


Figure 1:
A medium-
resolution
graphic pro-
duced by the
PC Peacock

“composite video” color output, which connects to cheaper composite color monitors. But compared to the RGB signal, the IBM board’s composite video signal is abysmal; even large, 40- by 25-pixel characters are often illegible, blurry masses when displayed on a composite monitor in medium-resolution mode.

Dual Solution

The only reasonable solution for someone who stares at text and numbers for most of the day but occasionally produces graphics is to buy both the monochrome and color graphics boards and monitors. That’s reasonable, of course, only if your budget allows.

Enter the third-party vendors, the companies that fill the technical and marketing gaps left by the IBM giant. These companies prosper only as long as their products beat IBM’s price and performance or offer features not available from IBM. Two

products that fit this bill are the PC Peacock graphics board from MA Systems and the Graphix Plus II board from STB Systems. The PC Peacock simply replaces the IBM Color/Graphics Adapter. The Graphix Plus II, on the other hand, is a complete monochrome board that produces medium- and high-resolution graphics on a monochrome monitor and a nearly complete color graphics board that produces enhanced medium- and high-resolution color graphics.

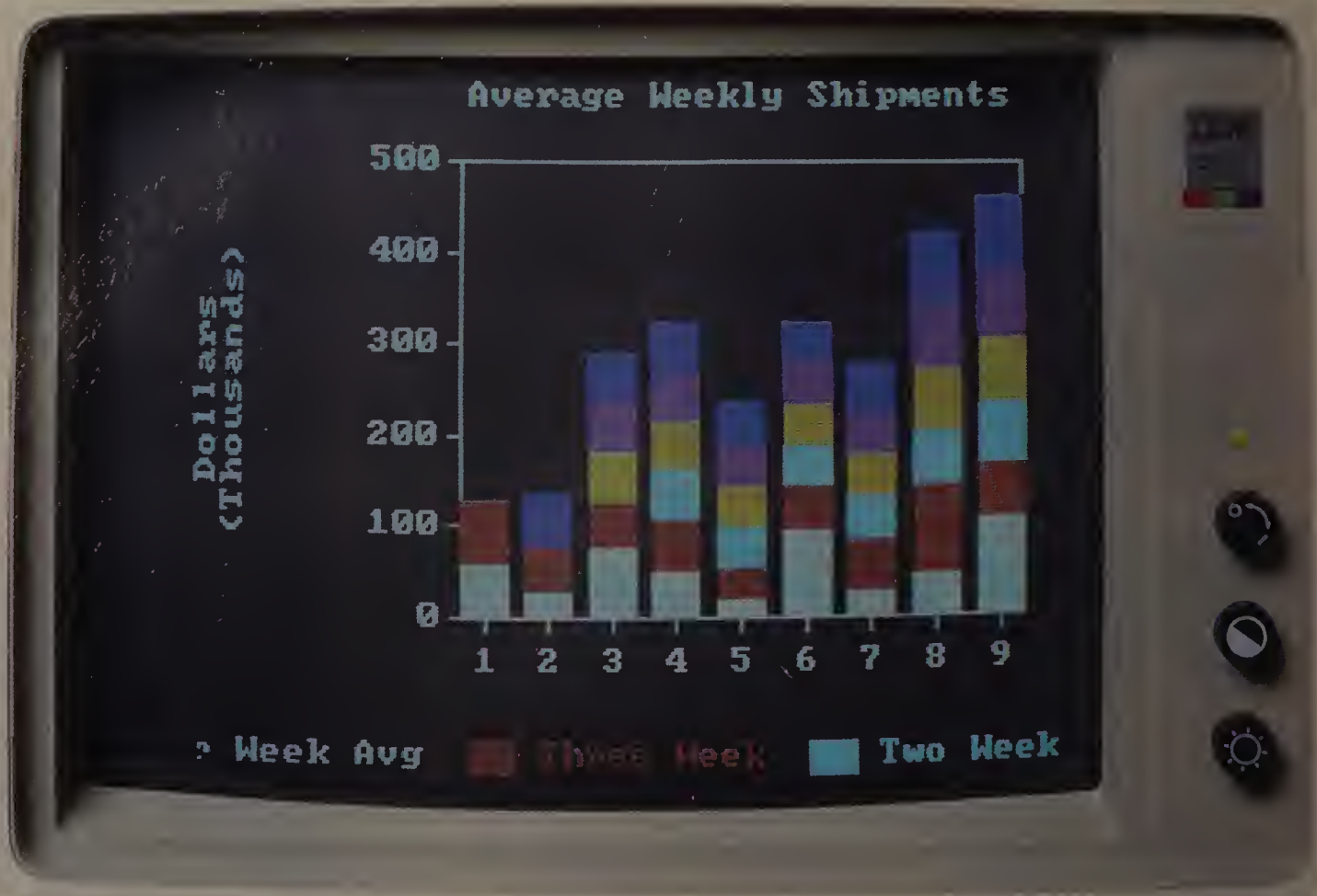
PC Peacock

If you are about to add color to your PC, you would do well to consider the PC Peacock. The board includes two 80- by 25-pixel text fonts—one, thankfully, more legible than the IBM Color/Graphics Adapter font.

The PC Peacock also comes with a parallel port—all for \$299, which is a savings of \$95 over a similar IBM configuration.

The PC Peacock is actually two full-length circuit boards sandwiched together. This “biplanar” design is surprising when you consider that the Peacock does little more than the IBM graphics board. An engineer at MA Systems explained that the company originally planned a board with double the RAM of an IBM Color/Graphics Adapter in order to generate 16 simultaneous medium-resolution colors—a task requiring two printed circuit boards. MA Systems later dropped the idea but kept the board structure. Luckily the Peacock can squeeze into one PC slot without nudging adjacent boards. The fit is tight, however, and heat dissipation may be a problem if you have a number of expansion boards already installed.

Figure 2: A 1-2-3 graphic displayed in medium resolution by the Graphix Plus II. Sixteen colors are possible, but only eight are displayed because of 1-2-3's limitations.



With the exception of a green jumper wire soldered across the board, the Peacock appears to be built well. Installation is easy, due largely to exemplary instructions. The Peacock's manual is one of the few I've seen that doesn't assume you open PCs and install circuit boards for a living. The manual's many clear diagrams show you how to do everything from finding the cover screws on the PC to finding and setting switches on the computer's motherboard.

Once installed, the PC Peacock precisely emulates the medium- and high-resolution graphics of the IBM Color/Graphics Adapter (see Figure 1). Programs such as *1-2-3*, *Graphwriter*, and *Flight Simulator* produce graphics as they would with the IBM board. Unfortunately, the manual is inaccurate in describing the board's medium-resolution capabilities, repeatedly claiming that the Peacock "offers multicolor graphics with four

foreground colors" displayed simultaneously against one background color. Like the IBM Color/Graphics Adapter, the PC Peacock can display only three simultaneous foreground colors and one background color in medium-resolution mode.

The Peacock's composite color output is much better than the IBM board's. Colored text on a colored background in medium-resolution mode is readable, though 80- by 25-pixel characters are not very legible. For text editing an RGB color monitor is still preferable.

The PC Peacock's RGB output is likewise superior to the IBM board's, and the displayed characters are lean and crisp, once you fiddle with a jumper plug on the board. When this small connector is removed from the board, the 80- by 25-pixel font gets sharper. If you prefer fat and fuzzy characters, you can, of course, replace the jumper. The manual gets this procedure backward, stating that the slimmer font appears when the jumper is in place.

Keep in mind that the PC Peacock will not run the IBM Monochrome Display, though it will run single-color monitors that accept composite signals. And if you are already using the IBM Monochrome Display Adapter, you can still easily install the PC Peacock to run a color monitor. If there is already a parallel port installed (addressed by DOS as LPT1:) such as the one built into the IBM Monochrome Display Adapter, the PC Peacock will automatically assign its parallel port to LPT2:.

Is the PC Peacock for you? If you get a PC and plan to use only a color monitor with it, the PC Peacock is a good buy, since it matches or outperforms the IBM Color/Graphics Adapter and has a parallel port. You may find the PC Peacock's font good enough that you will not feel compelled to buy a monochrome board and monitor for text processing. If

you already own a monochrome board, however, and just want to add color to your PC, the PC Peacock is less attractive. Its parallel port is superfluous since the IBM monochrome board has one.

The only relevant difference between the PC Peacock and the IBM Color/Graphics Adapter, excluding the parallel port, is the PC Peacock's better color composite output. It's unlikely that you can live with the medium-resolution color characters and graphics produced by the PC Peacock on a composite monitor, but if you can you might not have to buy a more expensive RGB monitor.

Graphix Plus II

Any way you look at it, in terms of performance or cost, the Graphix Plus II from STB Systems is a champion. With only a few minor reservations, I would advise anyone about to buy a PC to get the Graphix Plus II instead of IBM's monochrome or color graphics boards. The Graphix Plus II beats both.

The Graphix Plus II fully uses the text and medium- and high-resolution graphics capabilities of the IBM Monochrome Display. It also completely emulates the RGB graphics capabilities of the IBM Color/Graphics Adapter. Sixteen simultaneous colors are available in medium-resolution mode (see Figure 2); four simultaneous colors are available in high-resolution mode. The board comes with a built-in parallel port and a battery-powered clock; STB also throws in print spooling software and a package that lets you create two simultaneous disk emulators. The Graphix Plus II's only limitations are that it does not produce color composite output and cannot display graphics on a monochrome and a color monitor at the same time.

A caveat is in order here. The Graphix Plus II reviewed was a pre-release version. The software interface to the board's enhanced graphics functions was not finished, and the

documentation was still the preliminary version and thus sketchy. Nevertheless, after hours of using this product's graphics features, I came away convinced of its power and versatility.

The Graphix Plus II is sturdily built, with the exception of the AA-size battery holder that dangles from a few inches of cable. (The battery powers the clock.) The battery holder is backed with a cheap adhesive strip, and the implication is that you should secure it somewhere in the PC; the only available space is on the back wall of the system unit.

Installation is easy, though I hope that future documentation will include more illustrations. This would be particularly helpful for finding and setting the eight switches on the Graphix Plus II board and the corresponding switches on the PC motherboard that must be set for the monitors and other boards you want to use. The documentation should also remind users to ground themselves before installing the Graphix Plus II, which like any similar device is sensitive to static electricity.

The board's capabilities are quickly evident when it is connected to both a color monitor and an IBM Monochrome Display. The PC automatically boots up in monochrome mode; to change monitors, you must use DOS's MODE CO command. The board's monochrome display is superb, with solid high-resolution characters that scroll without a trace of flicker. When I switched to a color monitor, I discovered that the character font was identical to the IBM Color/Graphics Adapter's 80- by 25-pixel font. But what a surprise when text scrolled smoothly up the screen! The bothersome flicker common with the IBM board was absent.

DON'T BUY SOFTWARE... BUY TOUGHWARE!

INTEGRATED SOFTWARE:

CO03	Cont. - Ultra File	\$117
PR00	Perfect Library	485
SR43	Sorcim - Supercalc 3	225
TM01	T/Maker III	165
VC04	Visicorp - Visicalc IV	155

DATA BASE/FILE MANAGEMENT:

AS01	Applied Software Tech. - Versa Form	263
AT04	Ashton-Tate - Friday!	175
CO02	Cont. - F.C.M.	75
FG02,3	Fox & Geller - dUtil; Quickcode	59/179
MR01	Microrim - R:Base 4000	285
SP01,2	Softw. Pub. - PFS: File; Report	88/78
SW01	Stoneware - DB Master Advanced	390
SU30	Super Soft - Personal Data Base	96
VC03	Visicorp - Visifile	190

WORD PROCESSING:

HA01,2	Hayden - Pie Writer; Pie Speller	130/70
HA11	- Pie Writer & Speller	189
MP10	MicroPro - Wordstar Professional 3.3	364
MP11,12	- Mailmerge; Spellstar (ea.)	124
PR01,2	Perfect Writer; Speller	188/113
PR11	Perfect Writer + Speller	249
SP04	Softw. Pub. - PFS: Write	88
SU10	Super Soft - Star-Edit	175
VC11	Visiword w/ free Visispell	238

SPREADSHEET:

MP40	MicroPro - Calcstar	85
MS40	MicroSoft - Multiplan	145
MS41,2	- Multi-Tool Budget; Fin'l Statm.	97/67
PR04	Perfect Calc	113
VC05	Visicorp - Visiforecast	71
VC41,2	- Desktop Plan; Visischedule (ea.)	190

GRAPHICS:

FG01,4	Fox & Geller - dGraph; Grafox	179/194
GC71,2	GCI - Graphwriter: Basic; Ext. (ea.)	316
GC70	- Both	476
SP03	Softw. Pub. - PFS: Graph	88
VC43	Visicorp - Visitrend/plot	190

ACCOUNTING/FINANCIAL:

BP07	BPI - Personal Accounting	132
BP01-3,5	- GL; AP; AR; PR (ea.)	394
CO01	Cont. - Home Accountant +	82
CO04	- Property Management	305
CP81	Computronics-Versa Ledger II (CD/GL)	129
CP82,3,5,6	- Versa AP; AR; Invent.; PR (ea.)	86
FN01	Financier II	116
SP81-7	Sys. Plus - GL; AP; AR; Invent.; Sales Ord.; Purch. Ord.; PR (ea.)	295

LANGUAGES/UTILITIES:

MS01	MicroSoft - Basic Compiler	249
MS02	- Business Basic Compiler	389
MS04	- C Compiler	329
MS05	- Fortran Compiler	235
MS06	- Pascal Compiler	229
MF01	Microstuf - Crosstalk XIV	103
PF05	Perfect Link	109
SU01	Super Soft - C Compiler (8086)	349
SU02,3	- Fortran; Ratfor	295/75
SU04,7	- Disk Doctor; Disk Edit (ea.)	75
SU05	- Basic Compiler (8086)	220

DISKETTES/ACCESS:

CD01-2	Control Data 5" SS/DD; DS/DD 48T	26/36
GN01	Generik - 5" DS/DD 48T 100/bx	181
PI02	PTI - 6 Plug Surge Prot. & Noise Filter	60

CALL - 24 HR MC/VISA HOTLINE:

US (except ILL.) 800-621-5199

Illinois 800-972-5855

Or Write: Ramware Software Products
Dept. A47

49 Carmer Avenue
Belleville, NJ 07109

Send name, address, telephone #, quantity and description of items you want, and payment as described below. NJ residents add 6% sales tax. Domestic orders add \$3.50 shipping and handling (if order is > \$500, forget the S&H). Foreign order add 10% S&H, minimum \$10. Payment may be by check, money order, Mastercard or Visa. NO COD's, please. Allow two to three weeks for personal check to clear. For MC/Visa orders, send card #, expiration date, bank name, and signature. There is no surcharge for credit card orders. Prices and items subject to change.

RSP
"LOGIC WITH GRIT"

Circle 586 on reader service card

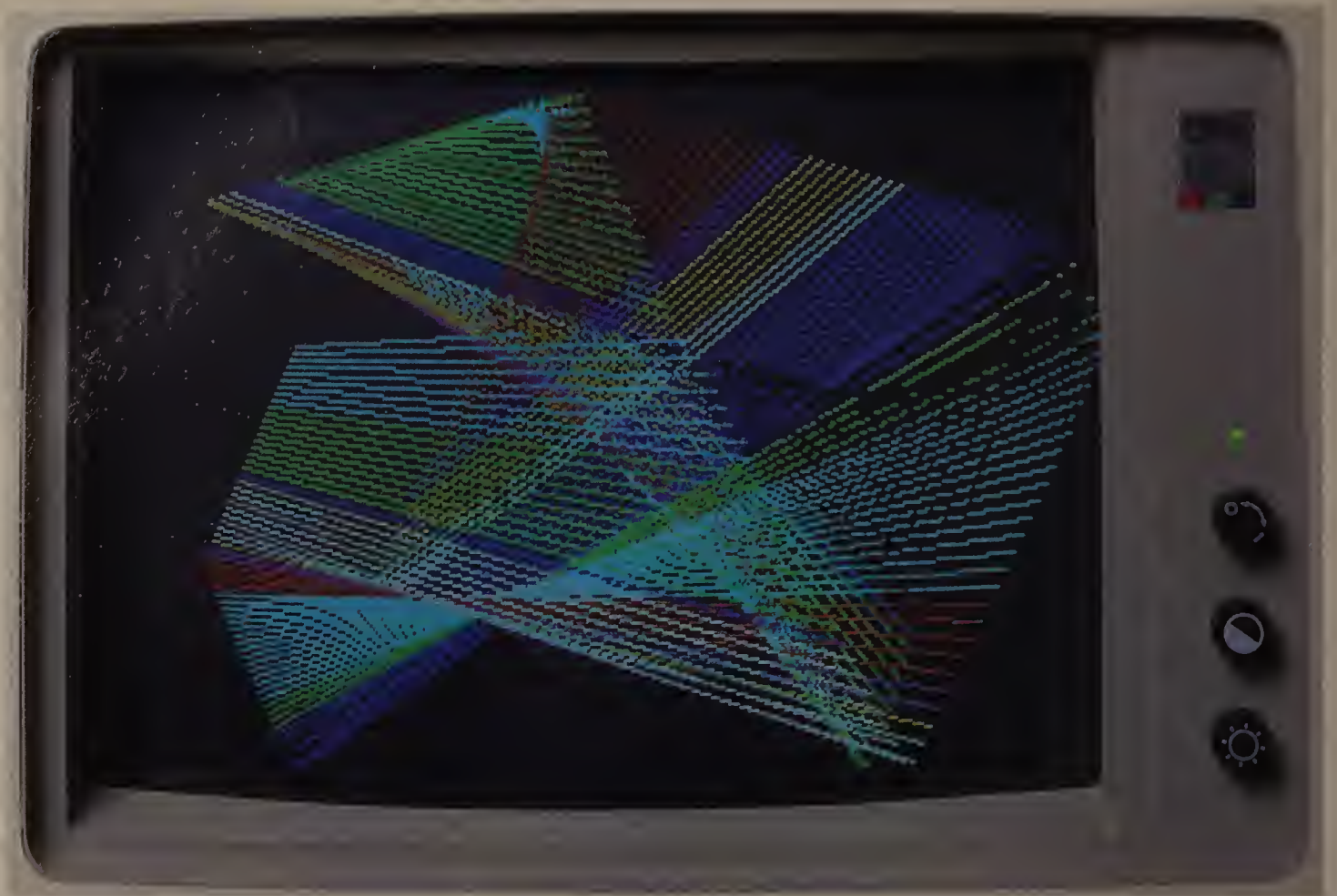


Figure 3: A 16-color medium-resolution graphic generated by the Graphix Plus II

At this point I tested various graphics packages, including *Flight Simulator*, *1-2-3*, *Graphwriter*, and a public domain version of Logo called *Ladybug* that switched back and forth between both monitors. With the notable exception of *1-2-3*, the programs produced graphs on both the color and monochrome monitors. When the Graphix Plus II switches between color and graphics modes, the inactive screen goes blank. On a PC with both IBM boards installed, the last image on the inactive screen continues to be displayed. I know of no software that relies on this feature, though programmers might find it useful.

The only IBM Color/Graphics Adapter feature not emulated by the Graphix Plus II is color composite video. The board supplies a composite video output, but all color information has been stripped out and

the colors are displayed in shades of gray on a composite monitor. This is not necessarily a fatal limitation if you consider the blurry characters the IBM Color/Graphics Adapter displays in composite mode. The characters and graphics produced by the Graphix Plus II's composite signal are nearly as sharp as their RGB counterparts. The only problem is the "snow" that appears whenever 80-column text is scrolled.

With the Graphix Plus II, graphs and charts are within your grasp, even if a \$680 color monitor is not. While color is an asset to any graphic, medium- and high-resolution monochrome graphics can do the job.

The IBM Monochrome Display's lack of color is not as limiting as it might seem. The goal of most business graphics packages such as *1-2-3* or *Graphwriter* is to print out graphs and charts for inclusion in reports. The main purpose of displaying

graphs and charts on a monitor is to allow you to preview your work before sending it to the plotter or printer. Since this can be done just as well in green and black, and since most color monitors cannot match the resolution or colors that many programs generate and many printers, plotters, and slide generators produce, you may find an IBM Monochrome Display and a Graphix Plus II board sufficient for your business graphics.

Be prepared for the color graphics on a monochrome monitor to look a bit squashed along the vertical axis—the IBM Monochrome Display's vertical resolution is 350 pixels and the Color/Graphics Display's is 200. A picture will only appear 57 percent as high and 89 percent as wide as it

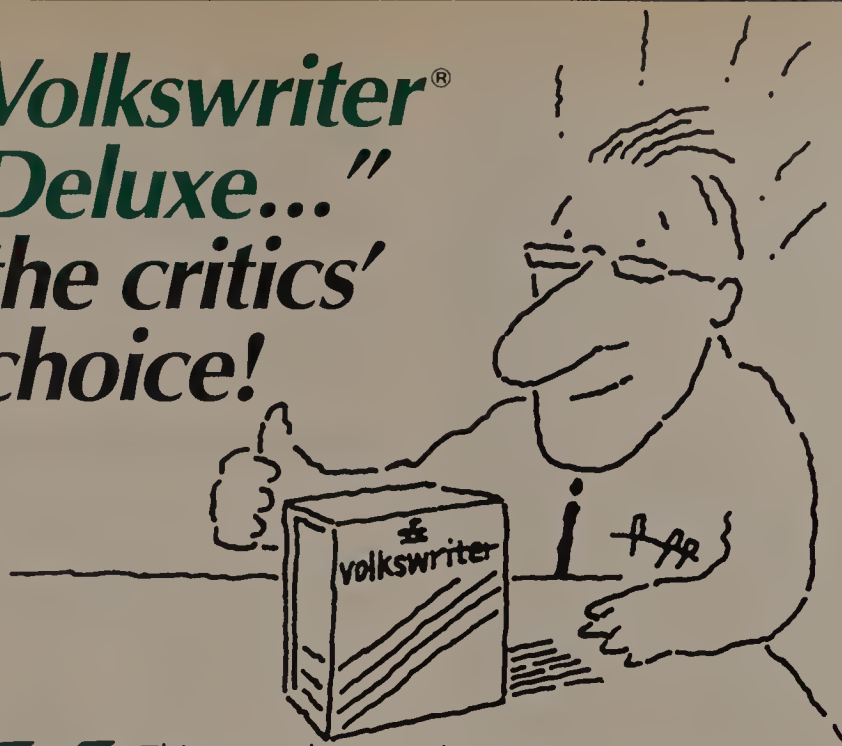
should be, but it will print out in its proper dimensions. Given this distorted display, you will not want to edit 80- by 25-pixel text in monochrome graphics mode, but you can switch back to the text mode's high-resolution font with DOS's MODE MONO command.

Setting the screen's border as any color other than black throws the display into a tumult of irregular diagonal lines.

The only monochrome graphics bug appears when the screen's border area is set to a color other than black. This throws the display into a tumult of irregular diagonal lines, making any graphics or text illegible. Note too that 1-2-3 will not work when the board is set up to switch between color and monochrome monitors.

Graphix Plus II's enhanced graphics—more simultaneous colors in medium and high resolution (see Figure 3)—are impressive but may not be terribly useful at this point. Sixteen-color graphics in medium resolution are breathtaking but also painfully bright. The prospect of four-color graphics in high-resolution mode is more interesting, but users won't receive any benefits of this graphics power until STB supplies a thorough technical manual and a broad library of support software such as assembler subroutines and extensions to BASIC for programmers creating software for the board. At the time of this review, such software was unavailable, though STB notes it will be on the market when the Graphix Plus II is commercially released.

"Volkswriter[®] Deluxe..." the critics' choice!



“ Thirty word processing programs were reviewed ... no other program received a higher overall evaluation than Volkswriter Deluxe.”

Software Digest Ratings Newsletter, January 1984

“If WordStar™ set a standard ... Volkswriter Deluxe sets a new standard for transparency, simplicity, and speed. You can learn Volkswriter in under an hour ... because it does so many things exactly the way you think they should be done.”

“VOLKSWRITER DELUXE is the best buy in the IBM-PC™ writing tool arena.”

Charles Spezzano, Whole Earth Software Review, January 15, 1984

“Volkswriter Deluxe ... a simple way to word processing power ... for writers who like to think.”

Washington DC Capital PC User's Group Vol. 3, #4

“Lifetree ... provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent.”

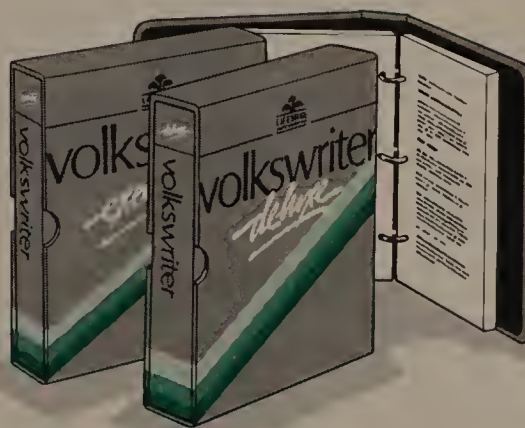
“In sum, this is a unique word-processing program.”

John Lombardi, Reviewer, InfoWorld, April 16, 1984

”

We couldn't have said it better ourselves!

*Suggested Retail Price:
Volkswriter Deluxe
\$295 for the IBM-PC,
PC compatibles, TI
Professional™ and
TRS-80 Model 2000.™*



“simply amazing”

IBM PC is a trademark of International Business Machines. TI Professional Computer is a trademark of Texas Instruments. TRS-80 Model 2000 is a trademark of Tandy Corp. WordStar is a trademark of MicroPro.
© 1984 Lifetree Software, Inc.

**LIFETREE
SOFTWARE INC.™**

411 Pacific Street
Monterey, California 93940
(408) 373-4718 / TWX 176786

**WE TURN
YOUR IBM PC INTO
MORE
THAN JUST A PC.**



Want your PC to talk to your mainframe? You'll get all the right connections with VTERM II™, Coefficient's DEC® terminal emulator for the IBM® Personal Computer.

Coefficient brought you the first VT100® emulation for the IBM PC. With VT100, VT52®, VT101®, VT102®, printer support, file-exchange and much more, VTERM I was a great communicator. Now VTERM II gives you an even better line to your mainframe with lots of new features: error-free file transfer including host software and XMODEM mode; optional 132 column display; autodialing; on-line help; plus a unique softkey command system that lets you automate many communications functions. And that's not all. VTERM II has one advanced capability that really puts other emulators on hold: a single key that lets you switch instantly back and forth between DOS and VTERM II, without ever losing your terminal screen or communications link. So call Coefficient today for VTERM II.

VTERM I IS ALSO AVAILABLE THROUGH YOUR LOCAL IBM BRANCH OFFICE.

COEFFICIENT SYSTEMS CORPORATION

(212) 777-6707
611 BROADWAY, N.Y., NEW YORK 10012

VTERM is a trademark of Coefficient Systems Corporation.

Circle 166 on reader service card

● **Review**

The biggest potential problem for the Graphix Plus II—one that all enhanced graphics boards face—is the lack of standardization of enhanced graphics features. Until IBM unleashes its own high-resolution color

While the Graphix Plus II is a superior replacement for the IBM boards, don't expect to produce ten-color pie charts in the near future.

graphics board, every third-party vendor will come up with its own way of organizing the PC's video memory and communicating with the 6845 CRT controller chip that drives nearly all PC display boards. As long as this video chaos reigns, software houses will be reluctant to modify their products to accommodate this or any other enhanced graphics board. So while the Graphix Plus II is a superior replacement for the IBM monochrome and color graphics boards, don't expect to produce ten-color pie charts in the near future.

Graphix Plus II is a superior product, offering an extraordinary economy of both money and space. You get a monochrome board and a color graphics board, a parallel port, and a battery-powered clock for much less than the comparable IBM boards would cost while only using one of the PC's scarce expansion slots. Graphix Plus II can do double duty

as both a monochrome and a color graphics board, and it is versatile enough to replace only one of those boards and happily coexist with the other in the same PC—not an easy feat, since graphics boards tend to fight over the same memory location or parallel port.

Graphix Plus II is the board to buy if you need high-quality text display and occasional graphics, or if you need color graphics but don't want to sacrifice your eyes to the IBM Color/Graphics Adapter's fuzzy text font. If you buy this board for a PC equipped with a monochrome monitor, you will be able to create and display quality business graphics without spending hundreds of dollars on a color monitor. And if you eventually upgrade to color, you will already own the complete color graphics board. In fact, unless you are already wed to a composite color monitor, I can't think of a good reason not to buy this board. ●

David McCune is president of The Proteus Group, Inc., a New York consulting firm.

PC Peacock
MA Systems
2015 O'Toole Ave.
San Jose, CA 95131
408/943-0596
List price: \$299
Requirements: 64K

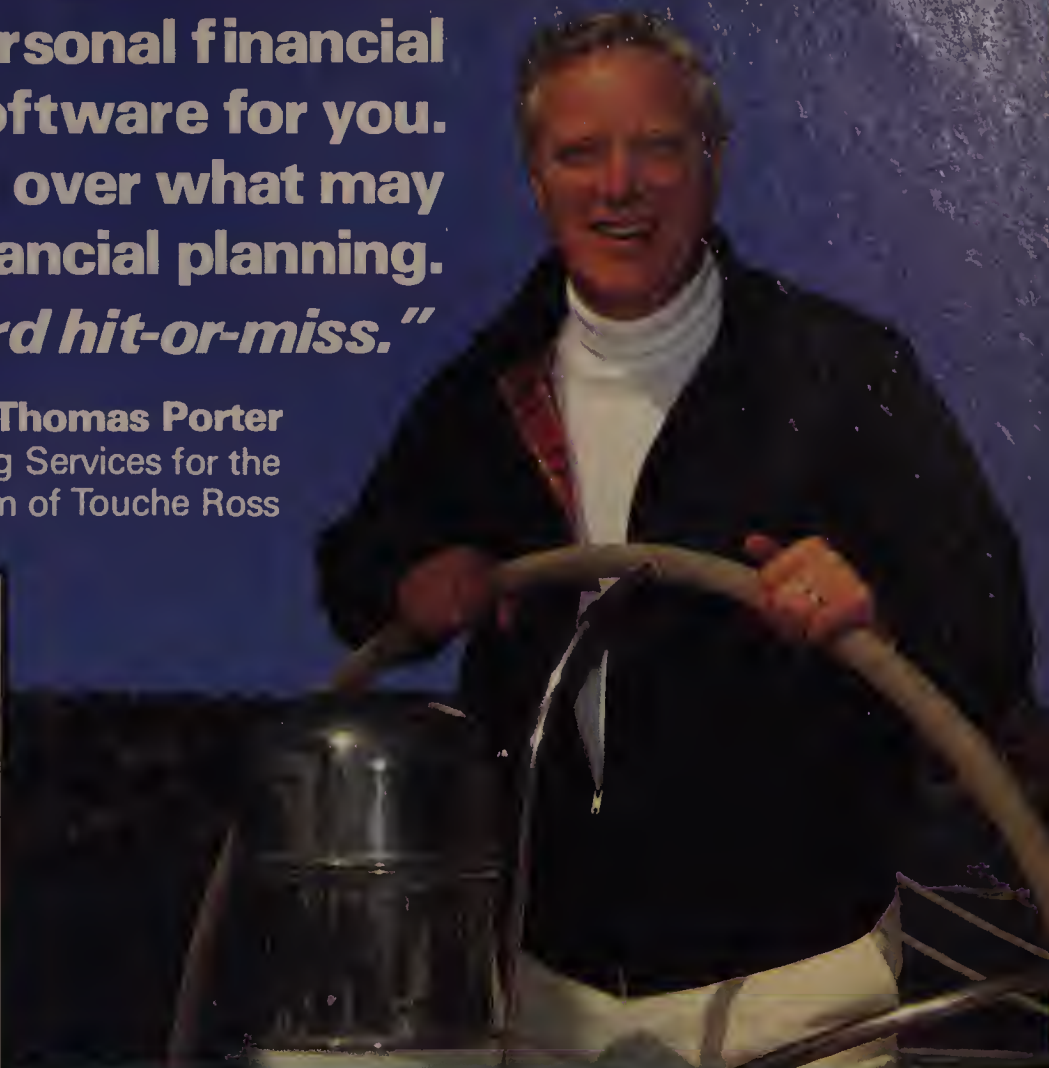
Graphix Plus II
STB Systems, Inc.
601 N. Glenville #125
Richardson, TX 75081
214/234-8750
List price: \$495
Requirements: 64K

"If you make more than \$35,000 a year. . .

Lumen has designed personal financial planning and management software for you. It can help you gain control over what may have been hit-or-miss financial planning. *These days you can't afford hit-or-miss."*

—W. Thomas Porter

Director of Personal Financial Planning Services for the Big-8 Accounting firm of Touche Ross



"When I wrote a best-selling book on personal financial planning and management, I wanted to provide a complete structure men and women like you could use to gain total control over their own financial affairs. Now Lumen has transformed the financial planning and management methods revealed in my book into two easy-to-run software packages for the IBM-PC *."

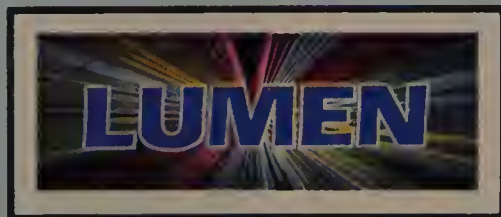
The Personal Financial Planner

1. **Net Worth Statement:** Calculated for you instantly.
2. **Income and Expenditure Ratios:** Are you within safe limits? Your Planner will tell you.
3. **Investment Analysis and Strategies:** Based on your own financial circumstances.
4. **Tax Planning:** The Planner helps you maximize benefits and minimize tax exposure.
5. **Retirement Planning:** Find out what you should be doing now to make your retirement dreams come true.
6. **Estate Planning:** The most important facet of personal financial planning becomes a breeze.
7. **Education Financing:** You have four children, ages 6, 9, 12, and 15. How much should you be setting aside now for their education?
8. **Insurance Analysis:** Are you overinsured? Underinsured? Do you have the right kind of coverage? The Planner will tell you.
9. **Personal Data:** Up-to-the minute personal financial data at the push of a button.

Lumen software is exclusively represented by
Prentice-Hall, Inc.
Business and Professional Division
Englewood Cliffs, New Jersey 07632

© 1984 Prentice-Hall, Inc.

* IBM-PC is a registered trademark of International Business Machines Corporation.



Lumen Systems, Inc. T.M.
The Brightest Name in Software

The Personal Financial Manager

1. **Checking Accounting Management:** Provides instant checkbook balancing—absolutely accurate.
2. **Credit Card Accounts:** No more racking your brains when an incorrect bill comes in.
3. **Assets / Liabilities:** You'll know instantly what you owe and what you own. Changes take only a few seconds.
4. **Budget Tracking:** Are you on budget? Over budget? Under budget? Find out what you need to do to stay on target.
5. **Check Printing:** The Manager can actually write your checks for you. And your balance adjusts automatically.
6. **Double Entry Bookkeeping:** The Manager sets up double entry books for you automatically.
7. **Account Status:** You get a complete series of 170 pre-defined accounts. No time wasted setting up your own.
8. **Tax Reports and Codes:** All your tax records kept in perfect order. You can do your income taxes during halftime of the Rose Bowl.
9. **Transaction Maintenance:** Income from all sources and expenses to all sources are orderly and balanced. Pull a report whenever you want or need one.

Instant \$20 Rebate

Ask for our Instant \$20 Rebate Certificate at any Authorized Lumen Dealer. It is worth \$20 when presented as partial payment for either the Personal Financial Planner or the Personal Financial Manager. For more information, or the name of the Authorized Lumen Dealer nearest you, *call toll free* 800-345-8112 (PA residents call 800-662-2444). Offer expires October 31, 1984.

YOU O TO IN PIC

To help you communicate more clearly.
To make tough subjects easy. To make work
go faster. To visualize, really visualize what
you have in mind.

Pictures of your ideas. Produced by Mindset.[™]
A new breed of hardware that gives you the
next generation of mouse-driven graphic

Intel's true 16-bit 80186 microprocessor. Two custom VLSI
processors for high speed, high resolution bit-mapped graph-
ics from 320 x 200 pixels in 16 colors. Runs Lumena[™] and
other professional graphic design programs, IBM PC soft-
ware, and the next generation of icon-based, mouse-driven,
windowed software.

IBM is a registered trademark of International Business Machines Corporation. Lumena
is a trademark of Time Arts



UGHT BE TURES.

power today. More impressive graphics than any we could show you on this page.

You can draw ideas. You can plot and rotate dimensional designs. Even change their perspective.

You can create charts, diagrams and layouts with brilliant clarity from Mindset's palette of 512 colors.

Mindset works, thinks and plays as fast as your mind. It runs IBM® PC software at blazing speed. Never puts your mind on hold.

Always goes with the idea flow.

Mindset's price? About one-third less than an IBM PC.

Bring us the programs you're using today. Try them on Mindset. Watch your ideas pop on the screen the way they come to your mind. Quickly. Completely. Your ideas never looked so good. So fast.

Call 1-800-447-4700 for your nearest Mindset dealer.

Mindset: The possibilities are endless.

INTRODUCING MINDSET

Mindset Corporation, 617 North Mary, Sunnyvale, California 94086

Circle 753 on reader service card

Perfect Compatibility

IBM & ACP

When you need competitive prices, prompt service and complete support, call us.

HARDWARE SPECIALS

CONTROL DATA

Full Size 320K DS/DD\$ 225*
"The drive IBM trusted with its logo"

TEAC

Half-Height 320K DS/DD\$ 195
"The #1 Rated Half-Height Drive"

AST MEAGAPLUS II w/256K\$ 434

64K RAM Chips 200ns Pre-Tested \$ 55

AST SIXPACK w/384K\$ 569

MAYNARD ELECTRONICS

10MB HARD DISK

(XT Lookalike)\$ 995

SOFTWARE SPECIALS

LOTUS 1-2-3/WORDSTAR

PROPACK\$ 699

LOTUS 1-2-3/HERCULES

GRAPHICS CARD\$ 679

MULTIMATE w/80K Word Speller . \$ 295

An advanced word processor with all
the features of a dedicated stand alone
system.

dBASE II/QUICKCODE\$ 549

EASYWRITER II/EASYSPELLER

/EASYMAILER\$ 195

MICROSOFT WORD w/MOUSE\$ 325

4-POINT GRAPHICS\$ 119

HARDWARE

COMPUTER SYSTEMS

IBM

PC w/256K 2 DS/DD Disk Drives\$ Call

TAVA

PC w/128K 2 DS/DD Disk Drives\$ Call
2 Parallel & 1 Serial Ports
Monochrome Monitor & Board

COMMUNICATION PRODUCTS

HAYES

Smartmodem 300\$ 209

Smartmodem 1200\$ 489

Smartmodem 1200B w/Smartcom II ..\$ 419

Smartmodem-to-IBM 6 ft. Cable\$ 25

Smartcom II\$ 99

TAC

Irma (Emulates 3278 Terminal)\$ Call

Irma Line (For Remote Emulation) ...\$ Call

We carry a wide variety of Mainframe Communication and Local Area Networks. For advice about which will suit your needs best give us a call and let us review them with you.

FLOPPY & HARD DISK DRIVES

CONTROL DATA

Full Size 320K DS/DD\$ 225

Half-Height 320K DS/DD w/Bracket ...\$ 195

DAVONG

5 MB to 32 MB Hard Disk Int./Ext. ...\$ Call
(Includes power supply, controller &
software)

TALLGRASS

12-70 MB Hard Disk w/Tape Backup ..\$ Call

TEAC

Half-Height 320K DS/DD w/Bracket ...\$ 195

Half-Height 640K DS/DD w/Bracket ...\$ 265

MAYNARD ELECTRONICS

10MB Hard Disk WS-1 (XT Lookalike) ..\$ 995

10MB Hard Disk WS-2 (XT Lookalike) ..\$1195

DISKETTES

SCOTCH 3M

SS/DD Box of 10\$ 30

DS/DD Box of 10\$ 35

DISK CONTROLLERS

MAYNARD ELECTRONICS

Standard Disk Controller\$ 169

with Parallel Port\$ 209

with Serial Port\$ 229

Sandstar Modular Disk Controller ...\$ 209

All Sandstar Modular Options Avail. ..\$ Call

EXPANSION BOARDS

MAYNARD ELECTRONICS

Modular Memory Board w/64K to

576K\$ 219

Modular Multifunction Board\$ 95

- Next Day Shipping
- No Credit Card Surcharge
- Company P.O. Accepted

We have built our reputation on offering quality products, prompt service and effective solutions. We understand your need for well-informed people who will work with you to meet your goals. Therefore we have developed a unique approach to sales. Our salespeople are well educated in the computer field and will speak with you not as salespeople, but rather as consultants. They will review your options and suggest alternatives to help you construct a system to best suit both your immediate and future needs. We also have a skilled technical staff that will guide you through any problems you may encounter after receiving your equipment.

HARDWARE CONT.

AST RESEARCH

(All AST boards include SuperDrive, SuperSpool and 1 year warranty)

SixPack Plus w/64K to 384K	\$ 269
MegaPlus II w/64K to 512K	\$ 269
Memory Board II w/64K to 384K	\$ 239
I/O Plus II	\$ 139
MegaPack w/128K or w/256K	\$ Call
PARALLEL, SERIAL, GAME OPTIONS	\$ 35

ORCHID TECHNOLOGY

Blossom w/64K to 384K	\$ 269
-----------------------	--------

TECMAR

Captain w/64K to 384K w/Software	\$ Call
----------------------------------	---------

QUADRAM

Quadboard w/64K to 384K	\$ 289
-------------------------	--------

PRINTERS & PLOTTERS

C. ITOH

Starwriter Letter Quality 40 cps	\$1195
Printmaster Letter Quality 55 cps	\$ Call
Cut Sheet Feeder (Feeds 200 sheets)	\$ 445

EPSON

(All Printers include GRAPHTRAX-Plus)

RX-80 (120 cps, 80 cols)	\$ Call
RX-80 F/T (120 cps, 80 cols)	\$ Call
RX-100 F/T (100 cps, 132 cols)	\$ Call

FX-80 F/T (160 cps, 80 cols)	\$ Call
FX-100 F/T (160 cps, 132 cols)	\$ Call
Epson-IBM Cable	\$ 30

HEWLETT PACKARD

HP-7470A Two Pen Plotter	\$ Call
HP-7475 Six Pen Plotter	\$ Call
HP-IBM Cable (works w/Lotus 1-2-3)	\$ 50

NEC

NEC 3550 Letter Quality 35 cps	\$1699
NEC 2050 Letter Quality 18 cps	\$ 950
Bi-Directional Tractor	\$ 235
Cut Sheet Feeder (Feeds 200 Sheets)	\$ 445
NEC-IBM Cable	\$ 30

OKIDATA

Microline 83A (120 cps, 132 cols)	\$ 575
Microline 92 (160 cps, 80 cols)	\$ 445
Microline 93 (160 cps, 132 cols)	\$ 749
Microline 84 (200 cps, 132 cols)	\$ 990
Plug n' Play	\$ Call
Okidata-IBM Cable	\$ 30

MONITORS

AMDEK

Video 300 Green Screen	\$ 300
Video 300A Amber Screen	\$ 145
Video 310A IBM Monochrome in Amber	\$ 170

PRINCETON GRAPHICS

HX-12 RGB Hi Resolution Color	\$ 499
Max-12 IBM Monochrome in Amber	\$ Call
SR-12 Hi Resolution Color	\$ Call

QUADRAM

Quadchrome Hi Resolution Color	\$ 519
--------------------------------	--------

VIDEO—MONITOR BOARDS

HERCULES	Graphics Card	\$ 359
----------	---------------	--------

PC COMPONENTS	Bi-Graphix I	\$ Call
---------------	--------------	---------

PARADISE SYSTEMS	Multidisplay	\$ 399
------------------	--------------	--------

PC+ PRODUCTS	Colorplus	\$ 419
--------------	-----------	--------

STB	Graphix Plus	\$ 399
-----	--------------	--------

QUADRAM	Quadcolor I	\$ 199
---------	-------------	--------

TECMAR	Graphics Master	\$ 499
--------	-----------------	--------

MISCELLANEOUS

FTG—Light Pen	\$ Call
---------------	---------

KEY TRONIC

Typewriter Keyboard (KB 5150)	\$ Call
-------------------------------	---------

Deluxe Keyboard (KB 5151)	\$ Call
---------------------------	---------

KOALA—Touch Tablet w/Software	\$ Call
-------------------------------	---------

KRAFT—Joystick	\$ 49
----------------	-------

MICROSOFT—Mouse w/Software	\$ 159
----------------------------	--------

MOUSE SYSTEMS—PC Mouse	\$ Call
------------------------	---------

T.G.—Joystick	\$ 49
---------------	-------

SOFTWARE

ALPHA

Database Manager II	\$ 199
Apple—IBM Connection	\$ Call

ASHTON TATE

dBase II	\$ 385
Friday	\$ 179
Framework	\$ Call

BEST PROGRAMS

PC/Professional Finance Program II	\$ 179
------------------------------------	--------

CENTRAL POINT SOFTWARE

Copy II PC	\$ 35
------------	-------

DIGITAL RESEARCH

CPM/86	\$ Call
Concurrent CPM/86	\$ Call

FOX & GELLER

Quickcode	\$ 169
dGraph (Requires Graphics Card)	\$ Call
dUtil (Utilities For dBase II)	\$ Call

OZ

FINANCIER—Financier II	\$ 119
------------------------	--------

FUNK—Sideways	\$ 49
---------------	-------

HAYES—Smartcom II	\$ 99
-------------------	-------

IMSI—4 Point Graphics (Rated #1)	\$ 119
----------------------------------	--------

INDIVIDUAL SOFTWARE

Tutorial Set (IBM PC/XT and DOS)	\$ 49
----------------------------------	-------

INFORMATION UNLIMITED SOFTWARE

EasyWriter II System (See Specials)	\$ 195
Accounts Receivable	\$ 299

Accounts Payable	\$ 299
------------------	--------

General Ledger	\$ 299
----------------	--------

Payroll	\$ 369
---------	--------

INFOCOM—Zork I, II, III	\$ 29
-------------------------	-------

LATTICE

C-Compiler	\$ 299
C-Food Smorgasboard	\$ 110

LIFETREE

Volkswriter	\$ 115
Volkswriter Deluxe w/TextMerge	\$ 179

LIGHTNING SOFTWARE

Master Type (Best Typing Tutor)	\$ 39
---------------------------------	-------

LOTUS DEVELOPMENT

Lotus 1-2-3 (Version 1A)	\$ Call
Symphony	\$ Call

MICRO DATA BASE SYSTEMS

Knowledgeman	\$ 350
--------------	--------

MICROSOFT

C-Compiler	\$ 349
Flight Simulator	\$ 35
Multiplan (New Version)	\$ 149
Multi-Tool Word	\$ 275
Multi-Tool Word w/Mouse	\$ 325
Pascal Compiler	\$ 250

MICROPRO

Wordstar w/Tutorial on Disk	\$ 259
Wordstar/MailMerge/CorrectStar/StarIndex (ProPack)	\$ 369

MICRORIM

R.base 4000	\$ 299
Clout	\$ Call

MICROSTUF

Crosstalk XVI (for Hayes Smartmodem)	\$ 109
--------------------------------------	--------

MORGAN COMPUTING

Trace 86 (Assembly Language Debug)	\$ 99
Ted (Program Editor)	\$ 79

PETER NORTON

Norton Utilities	\$ 55
------------------	-------

ROSESOFT

Prokey (Newest Version)	\$ 95
-------------------------	-------

SOFTWARE ARTS

TK!Solver	\$ 299
-----------	--------

SOFTWARE PRODUCTS

Open Access	\$ 399
-------------	--------

SATELLITE SOFTWARE INTERNATIONAL

Word Perfect (includes Speller)	\$ 299
P. Edit (Program Editor)	\$ 95

SOFTWARE PUBLISHING

PFS/File	\$ 95
PFS/Graph	\$ 95
PFS/Write	\$ 95
PFS/Report	\$ 79

SOFTWORD SYSTEMS

Multimate (See Specials)	\$ 295
--------------------------	--------

WANG PUBLICATION

Random House Proof Reader	
50K speller	\$ 45



APPLIED COMPUTER PRODUCTS INC.

1916 Welsh Road #6, Philadelphia, PA 19115

215-934-6990

1-800-223-3860

Circle 205 on reader service card

Our Policy

• We accept VISA, Mastercard, Money Orders, Certified Checks, Cashiers Checks, Personal Checks, Wired Funds. • We do not charge your card until we ship. • **No surcharge added on VISA and Mastercard** • Allow one week for personal and company checks to clear. • COD maximum \$500 Cash or Certified check on delivery. • Please use local phone number for order status inquiries. • Prices subject to change without notice. • Returns may be subject to restocking fee.

SHIPPING (U.S.). For monitors, printers, and hard disk drives add 2% to all orders. Blue label and Next Day Air available. For all other items add \$4. **Most orders shipped next day.**



Personal n

As an extension of yourself, your networked PC helps you become a better business consultant, secretary, messenger, meeting planner, graphic artist, author, financial analyst, executive, and friend.

You're probably getting a lot out of your PC. But you'll never realize its full potential until you get a 3Com EtherSeries™ network.

It takes about an hour to connect. Then you and your PC take on a series of exciting new personalities.

Our award-winning EtherMail™ puts you in touch with everyone else on the network. So you can reach out with electronic memos, notes, reports and gentle reminders about meetings and the boss' birthday...without worrying about them getting lost in the paper shuffle.

You improve the quality of your business life through sharing. With

more people using the same printers, plotters and disk storage, the cost goes down. And you can afford better peripherals. So the content and appearance of your work improves.

Sharing a wealth of information

All the leading software packages you're running now become even more useful by sharing data among them. Whether it's 1-2-3™ from Lotus, WordStar, VisiCalc, dBase II, MultiPlan or you name it, you get more out of each program by using information other people are putting in.

Avoiding duplicate work makes

3Com EtherSeries Products are available nationwide at full-service PC retailers. The seminar diskette requires graphics capability on an IBM or compatible PC. Trademarks: EtherGuide, EtherSeries, EtherMail: 3Com

Corporation; 1-2-3, Lotus: Lotus Development Corporation; COMPAQ: Compaq Computer Corporation. Registered trademarks: WordStar: MicroPro Corporation; VisiCalc: VisiCorp, Inc.; dBase II: Ashton-Tate; MultiPlan:

Microsoft Corporation; IBM: International Business Machines Corporation; TeleVideo: TeleVideo Systems, Inc.; Eagle: Eagle Computer, Inc.



etworking.

you, individually, far more productive. Multiply that extra efficiency by everyone in the network, and productivity increases company-wide.

EtherSeries: for your personal best

Ethernet has been widely adopted by computer companies as a networking standard. And we've made it even better with the hardware and software packages that make up EtherSeries. Our approach is the choice of Hewlett-Packard, Texas Instruments and Zenith for their own network products. As well as hundreds of companies using IBM PCs and most compatibles, such as COMPAQ,™ TeleVideo™ and Eagle.™

Now we've made it easier for you to get the fastest, most flexible PC network going. Our prices are about

the same as the slower, less powerful networks. And we've just introduced two new products that save you money. One lets you use diskless PCs. The other allows a PC to act as the network server and workstation at the same time.

To learn more, send for EtherGuide,™ our networking seminar-on-a-diskette. Or check the box for complete information. Either way, you'll see how personal networking can help you do your personal best.

3Com

The personal networking people

- ☐ Send me your EtherGuide seminar diskette. Enclosed is my check for \$10. (That's \$10 off the usual \$20 price.)
- ☐ Just send me more information. I'll let you know later if I want the diskette.

Name _____

Position _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Mail to: 3Com Corporation, 1390 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039, Attn: Corey Randall. (415) 961-9602

PCWD 8 1

From the Software Shelf

First impressions of recently released software products

Edited by Robert Luhn

From the Software Shelf samples a small portion of the many software programs flooding the PC market. These reviews—written by the staff of *PC World*—provide a brief glimpse at new word processors, spreadsheets, data base management programs, utilities, tutorials, and other products, including new additions to established software families, that might otherwise be overlooked. These impressions are not intended to take the place of a full length review of the product but rather to keep you informed of new products that we think will be of interest. *From the Software Shelf* examines programs for ease of use and installation as well as for the strong features or most significant weaknesses of these contenders for future software fame.



Harvard Project Manager

Can a PC help me organize and keep track of projects? Sophisticated project management techniques designed for large engineering projects such as the Alaska pipeline have recently been adapted for use on microcomputers. Project management software can be invaluable for keeping track

of large and complex projects. For small projects, however, you may find yourself spending a lot of time learning and using a program when manual methods may be adequate.

Using the Critical Path Method (CPM) and Program Evaluation Review Technique (PERT), the *Harvard Project Manager* (HPM) helps you organize a project into orderly segments, identify critical dates and interrelationships between the tasks that make up the project, and calculate costs and time requirements. You enter project tasks into a PERT diagram, which is a flow chart that shows the order and interrelationships of steps in a project. The program generates a schedule showing a project's critical path—those tasks whose completion is essential to the timely completion of the entire project.

The *HPM* does a nice job of crunching numbers and visually organizing dates. As start or stop dates and related costs are changed for a task, the program automatically adjusts dates and costs for the entire project. The *HPM* allows you to structure the project's calendar to account for holidays and unusual work weeks. You can print the PERT diagram, the schedule, the calendar, and information reports using normal page orientation or sideways for continuous printing of long graphics.

The *HPM* does a terrific job of managing information in windows. The opening menu displays four windows: a "roadmap" (PERT chart), a schedule (bar chart), a calendar, and

a function menu. Any window can be called up while you are using another. While entering tasks on your roadmap, you can call up a "forms" window and enter names, descriptions, dates, and other information about specific tasks. Pressing <Enter> returns you to the roadmap. The program's disk tutorial also makes full use of *HPM*'s windowing capabilities, explaining lessons in one window while executing them in another.

Keeping keyboard commands straight can be difficult. There are three types of cursor commands you need to remember: the <Backspace> key and <Space> bar control major function selection, the arrow keys control selections within a function, and the <Tab> key is used for editing project and task descriptions. The *HPM* command line is similar to *1-2-3*'s, allowing you to make your selection by typing the first letter of a command or by moving the cursor to the desired command and pressing <Enter>. Unlike *1-2-3*, however, cursor movement is controlled not with the arrow keys but with the <Space> bar and the <Backspace> key—a convention that might be confusing for *1-2-3* users.

HPM's strengths are its abilities to monitor and track potentially unwieldy projects and calculate dates and costs as you add or change data, but *HPM* does little to help you plan a project in its early (critical) stages. You are obliged to sit down with a notepad and pencil and figure things out—in fact, *HPM*'s documentation includes two drawings of a project organized on paper just to give you the right idea. For large and complex

projects, especially those that have benefited from manual project management techniques in the past, the *Harvard Project Manager* could be a valuable investment.—RM

Harvard Project Manager
Harvard Software Inc.
Software Park

Harvard, MA 01451
617/456-3400

List price: \$395

Requirements: 128K, two disk drives,
printer with graphics capability



CorrectStar

I hate to brag, but I was the spelling bee champ throughout grade school, my reign cut short only by adolescent indifference to such insipid competitions. Given my natural talent, do I need a \$195 spelling checker? Of course, there are those poor unfortunates who cannot spell “occurrence” to save their lives, and they may need such a program. With both viewpoints in mind I looked at *CorrectStar*, a new addition to the Mi-

croPro family, known mostly for its wildly popular *WordStar* program.

CorrectStar has some impressive features. It not only points out spelling errors but does a fast phonetic and alphabetic search for the right word through a three-part dictionary system. The 65,000-word Main Dictionary file is on a different disk than the *CorrectStar* program. Although you cannot edit or expand this dictionary, you can add Personal Dictionary files with up to 1500 words of your choice in each file. The *CorrectStar* program disk also contains an Internal Dictionary file, a 9000-word subset of commonly used words from the Main Dictionary that is loaded into the computer’s random access memory (RAM) for quick operation.

Although I have another natural talent—for eliciting software bugs—I had no problems running *CorrectStar*. The training guide and reference manual includes easy installation instructions. One step in the procedure requires copying the *CorrectStar* program onto a *WordStar* 3.3 disk. The *CorrectStar* option then conveniently appears on *WordStar*’s main menu. One keystroke takes you from *WordStar* to the spelling checker. You’re ready to go after obeying a prompt to remove the *WordStar* disk and insert the Main Dictionary disk in drive A:.

To operate the spelling checker you simply choose one of eight on-screen menu options—*CorrectStar* does the rest. Any “suspect” misspelled word is displayed at the top of the screen and also highlighted in the text; *CorrectStar* then offers a list of alternative words that closely resemble it. The correct word will usually appear at or near the top of the list. For the misspelled word *kur*, *CorrectStar* provided seven choices including *car*,

corps, and the correct word *cur*. You must decide whether the suspect word is incorrect and then choose the correct word from the list. One menu option will insert a corrected word into the text and reform the paragraph to maintain the proper margins.

One annoying limitation of the program is that you cannot jump forward or backward in the text but must proceed from the beginning to the end of the document. If you exit to *WordStar*, pressing <Ctrl>-L will return you to *CorrectStar* and relocate the cursor at its last position.

Given the manufacturer’s claim that *CorrectStar* “helps produce letter-perfect documents,” I tried a simple spelling test. Out of 34 spelling errors and typos in two paragraphs, *CorrectStar* corrected 23 errors and missed 11. However, numbers alone do not tell the tale. Two of the 11 words with errors were homophones (*steel* instead of *steal*, for example) so only a program that could understand a word’s meaning in context would spot the error; six were words correctly spelled but incorrect in context, such as *gun* and *gory* instead of *gum* and *glory*. The three remaining errors were uncapitalized words such as *indiana*, which illustrates that *CorrectStar* doesn’t recognize uppercase or lowercase letters.

CorrectStar shines when it comes to speed and ability to correct nearly unrecognizable words. I was pleased that *mirdur* and *purrfect* were changed to *murder* and *perfect*, but I was completely won over when *murcennerry*, *tiranicle*, and especially *arkeologcle* were immediately recognized and corrected.

Two conclusions can be drawn from this unscientific survey. First, *CorrectStar* is a handy tool for good spellers who are lousy typists or for anyone who must correct somebody else's mangled spelling in a document. Second, the program, like most spelling checkers, does not check for incorrect word usage or punctuation errors, so careful proofing is still necessary. The moral of the story: You cannot rely on the computer to do all your work for you—so what else is new?—CW

CorrectStar
MicroPro
33 San Pablo Ave.
San Rafael, CA 94903
415/499-1200
List price: \$195
Requirements: 192K, two disk drives,
WordStar 3.3



Practical Accountant

I am not an accountant, but I do get perverse satisfaction from successfully balancing my checkbook. The challenge, of course, is matching my perception of reality with the bank's, an uneven contest pitting my scrib-

bles and check stubs against their mainframe computers. Now help is here in the form of *Practical Accountant*, a program designed primarily to do the books for a small business but also useful in organizing complicated personal finances.

Practical Accountant provides a cash record of income and expenses, including accounts receivable and payable. With DOS 1.10 or 2.00 and a double-sided disk you can enter up to 1500 or 1700 items, respectively, while a hard disk (under DOS 2.00) accommodates the entry of 35,000 items. You can create a chart of accounts with 50 categories and 400 subcategories; assign 24 tax classifications of your own choosing (such as deductible or nondeductible); reconcile a cash record; prepare and print cash flow and other reports; print checks; and choose customized program options, such as automatic date carryover for cash record entries.

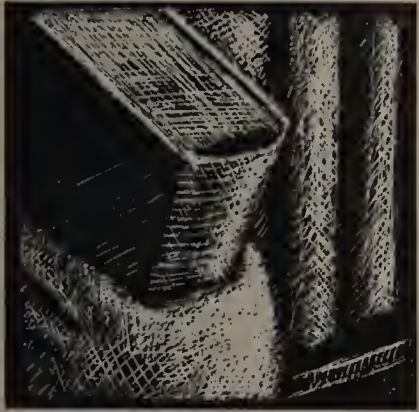
Practical Accountant's user manual, which includes a tutorial, is excellent. The manual is as concise as it is generous with reassurances, definitions of terms, diagrams of how the screen should appear at each step, and clear instructions on how to perform each function. The tutorial assumes no previous accounting or computer knowledge and is so well written that it is hard to make a mistake following its step-by-step instructions.

After graduating from the tutorial, you will find *Practical Accountant* is easy to use. The program is menu-driven, so its operation is straightforward once you have learned the rules in the tutorial. Major commands such as Save, Help, and Print are implemented with a single function key. Particularly useful is *Practical Accountant's* continuous display of the running balance for the cash record items: current cash balance, accounts receivable and payable, projected and reconciled balances, and current number of entries.

Practical Accountant's low price and the ease of getting started are selling points if you haven't used a computer or an accounting program before. But before buying this program for your small business, make sure it satisfies your particular accounting requirements. In considering hardware requirements, note that *Practical Accountant* runs on the IBM PC, PCjr, PC XT, and most major PC-compatible computers.

You may be better off tracking relatively uncomplicated personal finances on paper. But if you have several incomes or need to track cash disbursement, *Practical Accountant* may make your life easier.—CW

Practical Accountant
Softlink Corporation
3255-2 Scott Blvd.
Santa Clara, CA 95051
408/988-8011
List price: \$149.95
Requirements: 128K, one disk drive,
printer strongly recommended



In-Search

I've spent hours arguing that the microcomputer revolution is not comparable to that of the printing press. After experimenting with *In-Search*, I might change my mind. This program eases access to Dialog, the collection of over 200 information data bases covering engineering, science, medicine, business, government, and law (see "Dialog: The Ultimate On-line Library," *PCW*, Vol. 1, No. 6). With *In-Search*, you can dial and log on to Dialog with one keystroke, retrieve references using intuitive commands, and print abstracts or save them on disk. Professionals will find *In-Search* more thorough and faster than spending an afternoon in their local card catalog or a half hour paging through recent journals. The program is also ideal for any curious soul who wants simply to pursue his or her own eclectic interests.

In-Search makes Dialog's data bases available to all takers—not just to libraries, institutions, or wealthy Ph.D. candidates. While once you had to master an arcane code, now Dialog's commands are abbreviated to simple menu options and function keys. *In-Search* lets you scan the contents of a data base and helps you structure your search. After it has retrieved all the items you've specified,

you can disconnect (saving line and subscription charges) and review your booty or, if you didn't find what you wanted, move to another data base while on line. In five minutes I had all the bibliographic information I needed covering both *Ulysses* and the *The Sound and the Fury*; in another five I had abstracts on the implications of treating humus with chlorine. Both searches would have consumed hours using a card catalog.

In-Search is elegantly designed and features 50K of on-line help, intuitive commands, and prompt windows that spring from the center of your screen. The user manual is thorough, though it has difficulty explaining the Boolean logic required by Dialog. When you are planning the structure of a search, the documentation nudges you in the implications of the connectives "and," "or," and "not" as deftly as Socrates evoked geometry from a slave. In short, *In-Search* makes a sizable collection of information available to amateurs and professionals alike, who need not become experts in computer programming or telecommunications.—JS

In-Search
 Menlo Corporation
 4633 Old Ironsides #400
 Santa Clara, CA 95050
 408/986-0200
 List price: \$399

Requirements: 192K, two disk drives, modem (any Hayes modem, Novation's Smartcat, or an acoustic coupler)



TenKey

For all its high-tech power, the PC cannot add, subtract, multiply, or divide without some sort of calculation program. If you've found space for an adding machine next to your PC, this may not be a problem. If you use 1-2-3 or a similar program, you can also do simple math without much fuss. But if you don't have an adding machine or if you don't happen to be using a spreadsheet at the moment you need to calculate something, you must exit the current application, swap some disks, and load a program to perform your calculations.

TenKey solves these time and space woes. Developed by Photon Software, the program essentially turns your PC into the electronic equivalent of the adding machine, complete with an on-screen "tape" that keeps track of previous calculations and results. In addition to the standard four arithmetic functions, *TenKey* offers percent; memory +, -, recall, and clear; clear entry; clear all memory; constant; and 14 different decimal settings.

TenKey comes as an .EXE file that is easily copied onto a DOS disk; you can write a simple batch file to load *TenKey* automatically along with DOS when you boot up your system.

Since *TenKey* resides in memory (taking up either 9K or 23K), it's always available. If you need to check the numbers in a word processing document or want to perform a calculation while hip-deep in a data management operation, you don't have to search for an adding machine or run a separate calculation program. Hitting <Ctrl>-<Esc> opens a small *TenKey* window in whatever file you are working on and disables those keys not dedicated to *TenKey* functions. Press <Ctrl>-<Esc> again and *TenKey* disappears so you can continue with your work.

As the icing on the cake, *TenKey* lets you take the final result of a calculation and insert it where you left the cursor in a document. In short, *TenKey* is the program for anyone who has use for an adding machine but needs more desktop space.—RL

TenKey

Photon Software

P.O. Box 1408

Bellevue, WA 98009

800/426-2675, 206/451-8272

List price: \$48.50

Requirements: 64K, one disk drive



File Clerk * Congress

Since I correspond with members of Congress rather frequently (sometimes to praise, often to chastise), the appearance of *File Clerk * Congress* is something of a godsend. The program is just what any dedicated political letter writer needs: a complete data base of congressmen and congresswomen and senators that includes addresses, phone numbers, committee memberships, political parties, and more. *File Clerk * Congress* provides you with all this current information and the ability to alter the appropriate files as representatives change committees or assume leadership posts and as new representatives are elected and old ones are not. Information can be printed to screen, disk, or printer and selected according to a representative's state, committee, election year, house, party, or reference number; entire house memberships and committee lists (with specified ranges) can also be printed. A mailing label option is included with the package.

Configuring and running the program involve a bit of disk swapping; both BASIC and the program's batch files must be copied onto a DOS system disk; once you have started the system from this disk, you must remove it and insert the *File Clerk * Congress* program disk to begin work. Landrum Software claims that the next release of *File Clerk * Congress* will substantially reduce this disk juggling. If you use this program with a monochrome monitor, beware of Option 7, Reset System Colors, since almost any combination of text and background colors (other than white characters/black background) will turn your screen pitch black. Keep in mind too that since *File Clerk * Congress* is written in BASIC, it is sluggish and makes continual disk reads.

Nonetheless, the program does the job, and cheaply too. If you are a political organizer wanting to make your voice heard by 50 instead of 5 senators, *File Clerk * Congress* may well be worth the investment.—RL

*File Clerk * Congress*

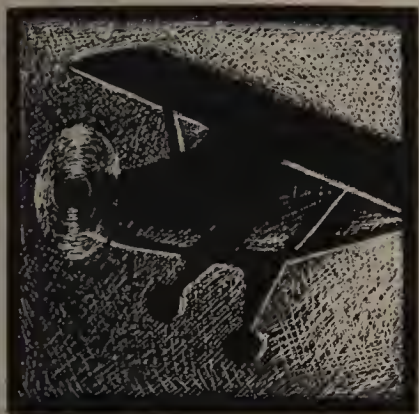
Landrum Software, Inc.

P.O. Box 842

Palm City, FL 33490

List price: \$39.95

Requirements: 64K, BASICA, one disk drive



IFR-PC-1

For the fly-by-the-seat-of-your-keyboard pilot, Microsoft's *Flight Simulator* provides hours of no-risk thrills and imparts some essential education about the basics of flying. If you become intrigued enough to actually climb into a real cockpit and take flying lessons, you will find *IFR-PC-1* from Anderson Aviation not only the logical extension of *Flight Simulator* but a useful introduction to the complexities of flying a plane by instruments only.

Most private pilots who are licensed to operate single-engine airplanes such as the Cessna 150 or Piper Commanche do so under Visual Flight Rules (VFR); when the sun is out and visibility is acceptable, they are permitted to fly. But flying at night or in inclement weather usually requires the pilot to read instruments, which not only indicate altitude, orientation, and heading but allow the pilot to find the way from one place to another using a variety of radio beacons. To fly legally under low-visibility conditions, a pilot must be licensed under Instrument Flight Rules, or IFR.

IFR-PC-1 is a real-time simulation aimed at instrument-rated pilots who want to brush up on their skills, pilots seeking an instrument rating, or desk-bound aces anxious to get a taste of what instrument navigation is all about. Unlike *Flight Simulator*, the view of the world is restricted to an instrument panel. After specifying airspeed, heading, wind direction and speed, turbulence, and fuel level, you set off on a cross-country journey, navigating by compass and radio beacons and eventually landing at an airport—all by instruments.

As with *Flight Simulator*, the airplane is controlled with cursor and function keys. You can bank, dive, or climb, play with the throttle, lower or raise the landing gear, set flaps, and change the settings on navigational radios. Your progress (and how your actions affect fuel consumption and heading) are monitored on a number of instruments that indicate heading, airspeed, altitude, climb rate, turning rate, engine RPM, flap and landing gear position, and fuel level.

Though *IFR-PC-1* is good clean fun for the earthbound, keep in mind that it's primarily designed for private pilots. If you've never flown before and want to get the most out of this package—namely its radio navigation features—I recommend that you go beyond the user manual and read up on the subject of aerial navigation.

For the pilot using this package, the user manual should prepare you sufficiently for flying and—hardest of all—landing by instruments. —RL

IFR-PC-1

Anderson Aviation, Inc.
333 Moore House Rd.
Yorktown, VA 23690
804/898-5699

List price: \$49.95

Requirements: 64K (with DOS 1.00 or 1.10) or 128K (with DOS 2.00 or 2.10), one disk drive, graphics board



Training for the dBASE II Program

I often wonder if I'm the only one who doubts the value of most tutorials. As it happens, most of my fellow editors agree that a *WordStar* tutorial has yet to arrive that cannot be abandoned in favor of the program's own help menus. Tutorials tend to address you in a condescending tone, overemphasize basic principles, and

then fade just when you are ready to use the program's more useful features. Cdex Corporation's *Training for the dBASE II Program* is no exception.

dBASE II is a problem unto itself. It is a widely used data base manager, but it has none of the progressive features of its more recent competition: menus, help screens, or a query language that resembles English usage. To its credit, the Cdex tutorial did teach me how to create a simple file, display selected records, and sort them in elementary ways. I also learned how to manipulate multiple data bases, albeit in a limited manner.

I understand most *dBASE II* tutorials waste a great deal of time teaching data entry, and I was relieved to find the Cdex tutorial more sophisticated than that. However, when it comes to writing command files (the *dBASE* equivalent of programming), the tutorial falls apart. It presents a few commands with little indication of how to use them. Most learning theory confirms my suspicion that people learn by tackling concepts or solving problems rather than by memorizing isolated pieces of information. Although it attempts to teach the user how to write command files, *Training for the dBASE II Program* falls short in this area.

The tutorial is essentially an electronic workbook with a few simple graphics, an annoying beep or two, and some condescending questions. Unlike a workbook, however, you

cannot go back a page. Haven't the folks at Cdex heard of <Esc>? The tutorial does not work interactively with *dBASE II*, so each time you leave the tutorial for prescribed exercises, you must enter *dBASE*, do the exercise, exit, and reboot the tutorial. Each time you reenter the tutorial you are required to start from the beginning, flip past copyright information and the introduction, and type in your name. When you are working in the more advanced chapters, this becomes a real nuisance because the second and third disks do not include the operating system.

For all its deficiencies, *Training for the dBASE II Program* does give you some fundamentals in data base management with this most popular data base management program.—JS

Training for the dBASE II Program
 Cdex Corporation
 5050 El Camino Real
 Los Altos, CA 94022
 800/982-1213, 415/964-7600
 List price: \$69.95
 Requirements: 64K, one disk drive ●

Where to buy Toshiba's P1351 and P1340 printers:

EASTERN

CYBER/SOURCE	
Southfield, MI	(313) 353-8660
Columbus, OH	(614) 451-9559
Pittsburgh, PA	(412) 323-6265
DIGITAL ENTRY SYSTEMS	
Waltham, MA	(617) 899-6111
GENERAL BUSINESS COMPUTERS, INC.	
Cherry Hill, NJ	(609) 424-6500
MICROAMERICA	(800) 343-4411
Framingham, MA	In MA (617) 877-8500
MONROE DISTRIBUTING COMPANY	
Cleveland, OH	(216) 781-4600
R & D/CAMELOT ASSOCIATES, INC.	
Northampton, MA	(413) 253-7378
ROBEC DISTRIBUTORS	
Montgomeryville, PA	(215) 368-9300

CENTRAL/SOUTHERN

B & W DISTRIBUTORS	
St. Louis, MO	(314) 569-2450
COMPU SHOP	
Richardson, TX	(214) 783-1252
CRYSTAL COMPUTERS, INC.	
Lenexa, KS	(800) 541-3030
St. Louis, MO	(913) 541-1711
	(314) 434-2667
CYBER/SOURCE	
Atlanta, GA	(404) 422-2029
Chicago, IL	(312) 789-3366
Indianapolis, IN	(317) 845-3461
Nashville, TN	(615) 255-4030
EASTERN COMPUTERS	
Virginia Beach, VA	(804) 340-2496
KALTRONICS DISTRIBUTORS, INC.	
Northbrook, IL	(312) 291-1220
MICROAMERICA	
Schaumburg, IL	(800) 323-6827
Tampa, FL	In IL (800) 942-4690
	(813) 623-6526
	In FL (800) 282-3385
	(800) 241-8566
Norcross, GA	In GA (404) 441-0515
	(800) 638-6621
Rockville, MD	In MD (800) 492-2949
MICROUNITED, INC.	
Forest Park, IL	(312) 771-1550
ONE STOP MICROPRODUCTS	
South Bend, IN	(219) 277-4972
PRICE ELECTRONICS CORPORATION	
Glenview, IL	(312) 998-6400
SYCOM DISTRIBUTING COMPANY	
Norcross, GA	(404) 441-3451
	(800) 241-8579
SYSPRINT, INC.	
Sarasota, FL	(813) 924-8278
TEK-AIDS INDUSTRIES, INC.	
Arlington Heights, IL	(312) 870-7400
	or (800) 323-4138
ZAMOISKI COMPANY	
Baltimore, MD	(301) 644-2900

WESTERN

BYTE INDUSTRIES, INC.	
Hayward, CA	(415) 783-8272
	or (800) FOR BYTE
COMPUTER RESOURCES	
Inglewood, CO	(303) 771-8930
CYBER/SOURCE	
Denver, CO	(303) 744-2461
Houston, TX	(713) 956-1423
CYPRESS DISTRIBUTING COMPANY, INC.	
San Jose, CA	(408) 297-9800
GRIFFIN COMPUTER SALES, INC.	
Carrollton, TX	(214) 446-6701
MICROAMERICA	
Carson, CA	(800) 421-1485
Richardson, TX	In CA (800) 262-4212
	(800) 527-3261
	In TX (800) 442-5847
MICROWARE DISTRIBUTORS, INC.	
Aloha, OR	(503) 642-7679
Bellevue, WA	(206) 451-8586
PG.I. CORPORATION	
Tempe, AZ	(602) 967-1421
	or (800) 528-1415
PREMIER SOURCE DISTRIBUTING	
Irvine, CA	(714) 261-2011
SMC INTECH SYSTEMS CORP	
Carrollton, TX	(214) 446-9055
SYSPRINT, INC.	
Richardson, TX	(214) 669-3666

CANADA

IRWIN ELECTRONICS	
Etobicoke, Ontario	(416) 533-2777
	In Ontario/Quebec (800) 268-1701
	Outside Ontario/Quebec (800) 268-1732

OR THESE TOSHIBA AMERICA, INC. REGIONAL OFFICES:

EASTERN	(201) 326-9777
CENTRAL/SOUTHERN	(314) 991-0751
WESTERN	(714) 250-0151

TOSHIBA

Two ways to show off your IBM PC.™



There's no better way to show off your IBM PC – or any other micro – than with the new line of Toshiba printers. They offer state-of-the-art features, high reliability and low price.

P1351

The new Toshiba P1351 printer has a unique high-density 24-pin dot-matrix print head. It lets you print crisp, clean letter copy at 100 cps, draft copy at 192 cps. And with the software-selectable downloading fonts, you get to pick from a variety of type styles.

The P1351 has more stuff to show. Like 180 x 180 dots-per-

inch high-resolution graphics, 132-column-width platen (great for spreadsheets and Lotus™ 1-2-3™ data processing and graphics), Qume SPRINT 5™ emulation, and a choice of either a forms tractor or automatic sheet feeder.

P1340

For considerably less, the new P1340 gives you just a little less. But it still has the same high-density 24-pin dot-matrix print head, the 180 x 180 dots-per-inch graphics resolution, and the Qume SPRINT 5 emulation. In addition to true proportional spacing and a

built-in forms tractor. Whichever printer you choose, nationwide service within 24 hours by Western Union technicians is available.

So the choice is yours. But when you choose Toshiba, you know you're putting on the best show possible.

For more information, call one of the distributors listed on the adjacent page.

IBM PC to P1340 and P1351 graphics utilizes PaperScreen and the IBM PC with color graphics adapter. IBM PC is a trademark of International Business Machines. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. SPRINT 5 is a trademark of Qume Corporation.

© 1984 Toshiba America, Inc.

In Touch with Tomorrow

TOSHIBA

Information Systems Division, TOSHIBA AMERICA, INC.

"Excuse Me,

A close-up photograph of a hand reaching into a filing cabinet to pull out a red folder. Several other folders, some labeled 'report' and 'file', are visible in the background, creating a sense of a busy office environment.

Make Way For Hayes'Please.
An advanced, easy-to-use data management system for the IBM® PC and compatibles.

Want to get your paperwork out of a clumsy file cabinet and onto your PC's screen, where you can manage it better? Frustrated with data base software that's either too limited or too difficult to use? Hayes offers you a simple word of kindness.

Please.™ A powerful, yet easy-to-use, system for organizing and managing your information. *Please* is flexible enough to store any data you enter, and it'll return data to you in exactly the form you need. *Please* does more.

It does it all faster. And it's sure to please!

"The menu, Please?"
Menus list all your options and tell you exactly which keys to press for every *Please* feature.

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, reliability

and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called "fields" in database lingo, and they're the very heart of your database structure.

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

Please will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from

your spreadsheet program. *Please* will even look up a name and company for you, your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special

"Make it snappy, Please!"

Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.

fields for a custom Output Plan. With a defined field for "COMMISSIONS DUE,"

Please can automa-

tically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please."

And if you ever change your mind and want to change the structure of your database, please feel free. Step-by-step instructions show you how.

You have the same flexibility with any database you and *Please* design. You can store up to 16 million records and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

Please."



"Put it here, Please."

Design a special screen format to position data in a particular place.

knowing all that storage power is there?

Just in case you ever need it?

Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured. *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

"Merge these, Please!"

Combine data from one database into another, without changing your original.

Everything about *Please* is designed to save you time and effort. So what could make data management even easier? *Please Application Templates*, that's what!

To help you get up-and-running immediately, we've developed a series of practical, pre-designed templates. You'll appreciate their well-thought-out structure, and "fill-in-the-blank" ease. Choose several! For business and personal use.

Including *Mailing List*, for storing names and addresses and producing mailing lists. *Contacts*, for managing facts and figures about your sales contacts. *Applicants*, for following applicants throughout the interviewing process. *Appointments*, for maintaining your calendar and tracking all of your business expenses. *Household Records*, a complete home management system. And more! Your dealer has details!

Buy *Please* now! Get a FREE *Mailing List* template from your dealer.

Second FREE template of your choice, direct from Hayes!

Help yourself. Please! And take advantage of these two valuable offers. See your dealer right away!



Hayes

Hayes Microcomputer Products, Inc.,
5923 Peachtree Industrial Blvd.,
Norcross, Georgia 30092. 404/441-1617.

With one line you can draw a thousand conclusions.

Without a good line, it's difficult to draw much of anything. And Taxan has an extraordinary line.

It's a dozen computer display monitors (RGB and composite as well as monochrome), one printer buffer, a television conversion tuner, several coaxial cables and a multitude of PC cards long. All segments designed and manufactured to represent the utmost in computer

display technology.

The Taxan product line.

The only one of its kind. Backed by a solid reputation and 15 years in the computer display industry.

So, if you're in the market for a computer monitor or related accessory, just ask one of our dealers to demonstrate our full line.

You can draw your own conclusions.



TAXAN
TAXAN
TAXAN

Taxan Corporation
18005 Cortney Ct. City of Industry, CA 91748
(818) 810-1291



THANKS TO COMPUSEVE'S CB SIMULATOR, "DIGITAL FOX" ACCESSED "DATA HARI" AND PROCEEDED TO AN "ALTARED" STATE.

The CB Simulator, where CompuServe Subscribers can Access Friends and Influence People on 72 Different Channels.

Just pick your handle and get on line. From math to matrimony, there's always someone out there who speaks your language. Friends from all over the U.S. and Canada are at it 24 hours a day. Talking tech or just having fun. And if you've got a secret, just use the CB Scrambler.

That'll fool the "lurkers," those CB "see it alls" who get their kicks by watching. Or you can always use the private talk mode for guaranteed one-to-one conversation.

The CB Simulator is just one of CompuServe's many electronic communications options that include a National Bulletin Board, Professional Forums and Electronic Mail. Plus, there's a world of on-line information and entertainment all for the price of a local phone call plus connect time.

You can access CompuServe with almost any computer and modem, terminal or communicating word processor.

To receive your illustrated guide to the CompuServe Information Service and learn how to subscribe, call or contact:

CompuServe

Consumer Information Service, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

In Ohio call 614-457-0802

An H&R Block Company

Circle 362 on reader service card



In the battle of wits with your computer, you now have a powerful new ally. An information management system called CDI/100.

It brings our experience in the minicomputer world to your micro, giving you a fast, powerful,

flexible tool for creating, accessing and changing data base information. CDI/100 is so easy, novices can proceed with ease. And so flexible, experts can adapt and build specialized applications.

CDI/100 features include a relational data base management

system — the only one you'll find with variable length fields. Plus an open-ended file structure with a recordkeeping system that is virtually limitless.

Most revolutionary of all, CDI/100 allows you to use a host of existing application programs,



How to conquer your computer.

so you can easily transfer files or add the programs of your choice.

To find out how you can acquire an information management system that lets you take charge fast and efficiently, ask for a test demonstration of CDI/100 wherever you buy your software.

Exceptional New Software Concept

- Everyone's Filing System
- English-like Inquiry Language
- Dynamic Menu System
- Integrated Help Features
- Relational Data Management
- Enhanced Basic Compiler
- Dictionary Supported Data Base
- Task Master

CDI
100TM
CDI Information Systems, Inc.
1309 114th Ave. S.E.
Bellevue, WA 98004
(206) 455-5117
INCREASE YOUR PERSONAL POWER.TM

Circle 354 on reader service card

What?

What is the latest R&D activity in Japan in the field of industrial robots?

Is?

Is the name "datascan" trademarked?

Which?

Which drugs have been successfully used to treat osteoporosis?

What?

What is the current and projected market for frozen orange juice?

Are?

Are there any personal computer user groups for attorneys in the Boston area?

Could you get answers to

**Introducing
In-Search—immediate answers
to millions of questions.**

Answers.

In-Search is an easy-to-use personal computer software package that lets you instantly retrieve answers to your questions from Dialog*, the world's largest collection of online databases.

With In-Search, your personal computer and modem, you can access this information over telephone lines.

All The Answers.

Imagine scanning thousands of articles in seconds. In-Search can do just that.

In-Search gives you over 80-million articles from thousands of sources: Newspapers, magazines, technical journals, investment reports, wire services, periodicals, annual reports and Yellow Pages.

Easy Answers.

1. Type the words or subject you wish to research into your

personal computer.

2. In-Search takes it from there, bringing up all the articles and references you need.
3. Simple on-screen graphics guide you through every step.

Fast Answers.

In-Search can find in minutes what could take days or weeks to find. You can now spend more time using information because you spend less time tracking it down.

Once you have the infor-

Which?

Which South American companies import electronic components from the U.S.?

How?

How can I find all the orthodontists in Toledo for my direct mail campaign?

What?

What are the mechanical properties of shape memory materials?

Has?

Has the cost-effectiveness of teleconferencing changed in the last year?

Who?

Who are some of the experts in medical sonar scanning techniques?

all these questions by 9 a.m.?

mation, you can store it on disk or print it out. In-Search is compatible with most word processing programs.

How to get the answers.

To see a demonstration or to purchase In-Search, call (408) 986-1200 for your nearest dealer. Or send this coupon for a demonstration disk designed for IBM, IBM-compatible, or Texas Instruments personal computers.

In-Search™



Use your VISA or MasterCard to charge the purchase of your \$5.00 diskette (California residents please add applicable sales tax)

ADDRESS _____

CITY _____

STATE _____

ZIP _____

MY OCCUPATION IS _____



Menlo Corporation

4633 Old Ironsides, Suite 400
Santa Clara, CA 95050

☐ Enclosed is \$5.00 for my In-Search demonstration diskette.

☐ Please send me a free booklet with more details.

NAME _____

COMPANY _____

Treasure ChestTM of Software

with Tecmar's CaptainTM, JrCaptainTM and 1stMATETM multifunction boards

Your PC can finally do all the wonderful things you've dreamed about — with the Treasure Chest of Software. Eliminate the need for many desk top accessories when you discover Tecmar's new easy to use software technology. With the press of a key you access many Treasure Chest programs without having to exit from a program you are now using. This Treasure Chest of Software gives your PC more power for:

Information Management

- Calculator
- Sorting Program
- Forms Generator - create letters, labels & reports
- Electronic Rolodex*
- Mailing List
- Electronic Notepad

Time Management

- Automatic Appointment Alert
- Calendar Generator
- Automatic Time and Date

System Improvements

- Background Printer - frees PC for other work
- Disk Simulator In RAM

Hardware Diagnostics

- Memory Diagnostics
- Printer Diagnostics
- Clock-Calendar Diagnostics

Information Security

- Confidential File Coding

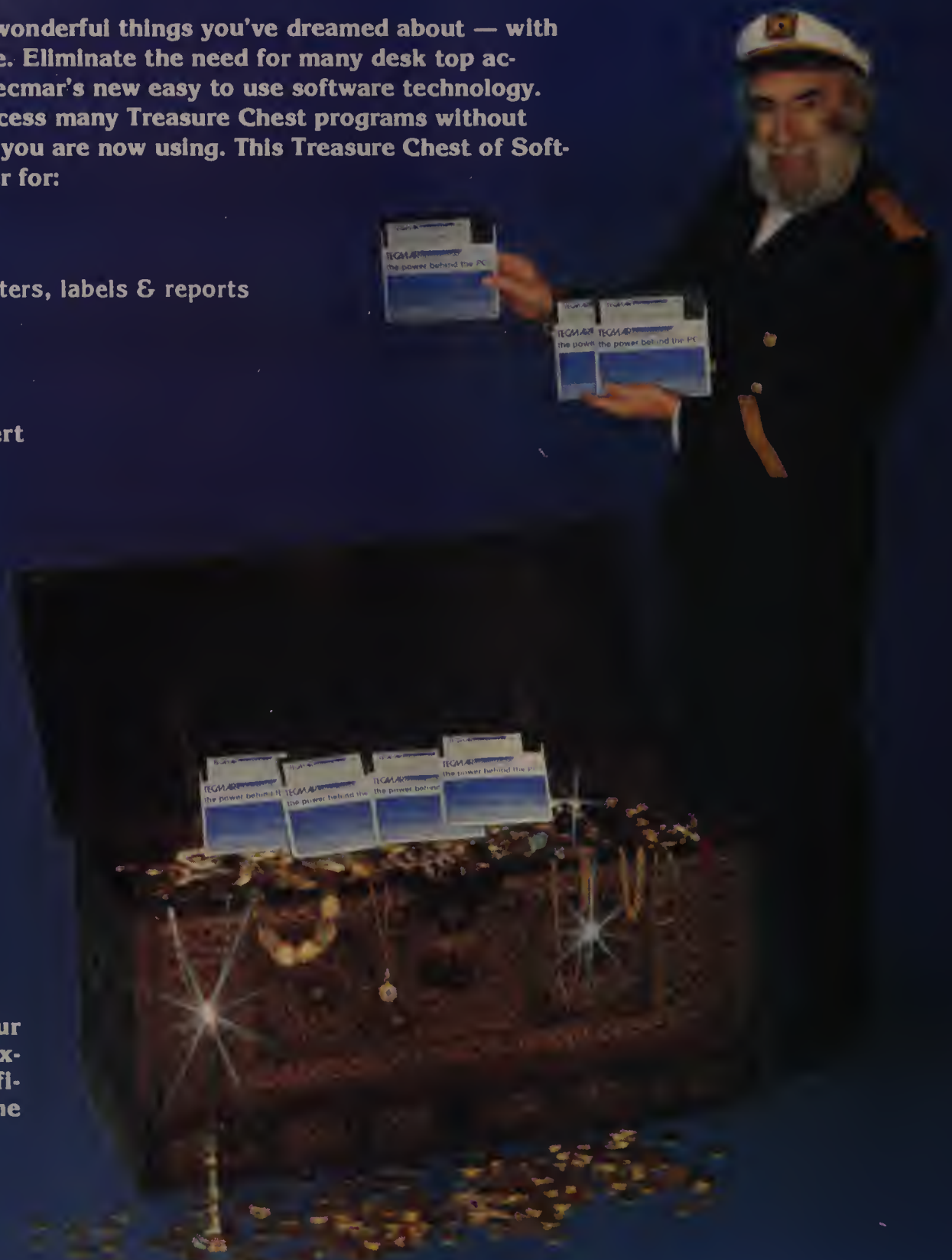
Use at Home

- Checkbook Balancer
- Inventory Management
- Banner Generator - prints letters 4.5 inches tall
- Tic-Tac-Toe
- and more !

You'll never want to turn your computer off once you experience the ease of use, efficiency and enjoyment of the Treasure Chest of Software.

INTRODUCTORY OFFER

*Rolodex is a trademark of The Rolodex Corp.



for the IBM PC - Captain & 1stMATE



- 0 to 384 KBytes of Memory on the Captain Board
- 0 to 256 KBytes of Memory on the 1stMATE Board
- Clock-Calendar with battery
- Serial Communications Port
- Parallel Printer Port
- Treasure ChestTM of Software

for the PCjr — the JrCaptain



- 0 to 128 KBytes of Memory
- Upgrade to 512 KBytes with addition of JrCadet Board
- Clock-Calendar with battery
- Parallel Printer Port
- Treasure ChestTM of Software

TECMAR

the power behind the PC

Tecmar, Inc. 6225 Cochran Road Solon (Cleveland), Ohio 44139-3377 Phone:(216)349-0600 Telex:466692

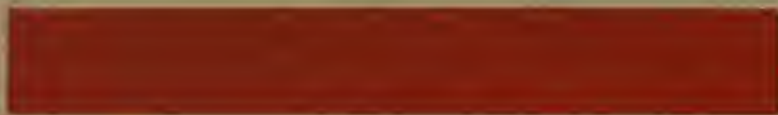
Circle 190 on reader service card

PCjr WORLD

August 1984

*The Home Computer Magazine
for People with PCjrs and Compatibles*

**Branching
into
Video**



Combining computers and video goes beyond arcade games. The PC-video connection also produces effective interactive teaching.

PC + Video: Working Partners

Katie Seger

You drop your 50 cents into the arcade machine and are propelled into the medieval world of Dirk the Daring, a fearless knight who leaps over bottomless pits and fights menacing dragons in a dangerous castle.

You direct the dashing knight with the machine's joystick, telling Dirk to run to the left instead of the right, to open certain doors, and to swing his sword at precisely the right moment to destroy his foe. If you make the correct decisions, Dirk wends his way through the 38 rooms of the Dragon's Lair castle and rescues a fair damsel in distress. If you make the wrong move, Dirk turns into a skeleton that disintegrates before your eyes, and you're out four bits.

You've just experienced an interactive video game. Unlike most computer games, *Dragon's Lair* has a variety of possible scenarios based on the decisions you make.

Now picture yourself in front of a PCjr. Instead of searching for maidens and decapitating dragons, you are ready to slay subjunctive verbs. Five menu options await you on the screen. You choose the third, 'Intermediate French Lesson'. The menu disappears, and the screen shows a video segment of two Parisians discussing the groceries they have bought for their Sunday dinner.



At the end of the conversation the program asks you a question. Depending on your answer, the program either continues with another question, repeats the conversation (perhaps at a slower speed so that you can practice your pronunciation), or sends you to the program's built-in dictionary to look up a word you don't understand.

Sound farfetched? It's not. The combination of computers and video that made *Dragon's Lair* an arcade hit in 1983 is nothing new. Organizations such as Xerox, Bechtel, the United States Navy, and Stanford University have been using computer-video instruction programs since the late 1970s. These programs, which combine the power of the personal computer with the pictures and sounds of a videotape or a videodisc, are only now making their way into small businesses, grammar schools and high schools, and homes.

At present the audience for computer-video educational programs consists mostly of Fortune 500 companies, colleges, and universities—the organizations that can easily afford them. Not only is the equipment to run the programs expensive, but a professionally produced, interactive computer-video program costs anywhere from \$300 to \$2000 a minute to make. These programs are usually specialized and have little appeal to home or small-business computer users.

Where the PCjr fits into this is not yet clear. However, considering the PC's increasing role in industrial video education, there's no doubt that as the PC goes, so goes PCjr. A number of firms are beginning to market interactive computer-video packages that have wide appeal, such as programs that teach elementary biology and beginning *WordStar* and *VisiCalc*. These tutorial programs are aimed at the traditional video market of schools but may also attract small-business and home users.

Linking Computers and Video

For a sophisticated interactive training program to be effective, the computer and its software must be able to command a videotape or videodisc player to perform tasks such as finding a certain part of a video program, replaying a segment, advancing to another

A professionally produced, interactive computer-video program costs anywhere from \$300 to \$2000 a minute to make.

segment, and freezing a frame in the program. Likewise, the player must be able to understand and follow the computer's commands. Home video players are still severely limited in their ability to work with computers, so industrial machines, such as the Sony 5800 videotape player and the Pioneer LD-V1000 videodisc player, are used for interactive training programs.

Most personal computers were not designed with video in mind, so you have to connect the computer to the player with special hardware. Several companies, such as Allen Communication, Cavri, and Whitney Educational Services, produce controller boards for IBM and Apple computers that link them to video machines. The PCjr, because of its small system unit, cannot use the internal controller boards currently available for the PC.

However, the PCjr can work with many stand-alone controller boxes such as Allen Communication's Universal Video Controller (UVC). These controllers use any computer's standard serial port to connect to a variety of industrial videotape and videodisc players now on the market. Some models, including the UVC, enable computers to control two videotape players, two videodisc players, or a videotape and a videodisc player. The cost of such models—up to \$1000—may be a little steep for PCjr owners.

Keep in mind that the PCjr's serial port is not the standard 25-pin connector and must be equipped with the IBM PCjr Adapter Cable for Serial Devices to work with a stand-alone controller.

One Screen or Two

Figures 1 and 2 illustrate typical computer-video combinations. Figure 1 shows a PCjr and a videodisc player running one display; Figure 2 has the same setup running two displays. Two displays are often necessary

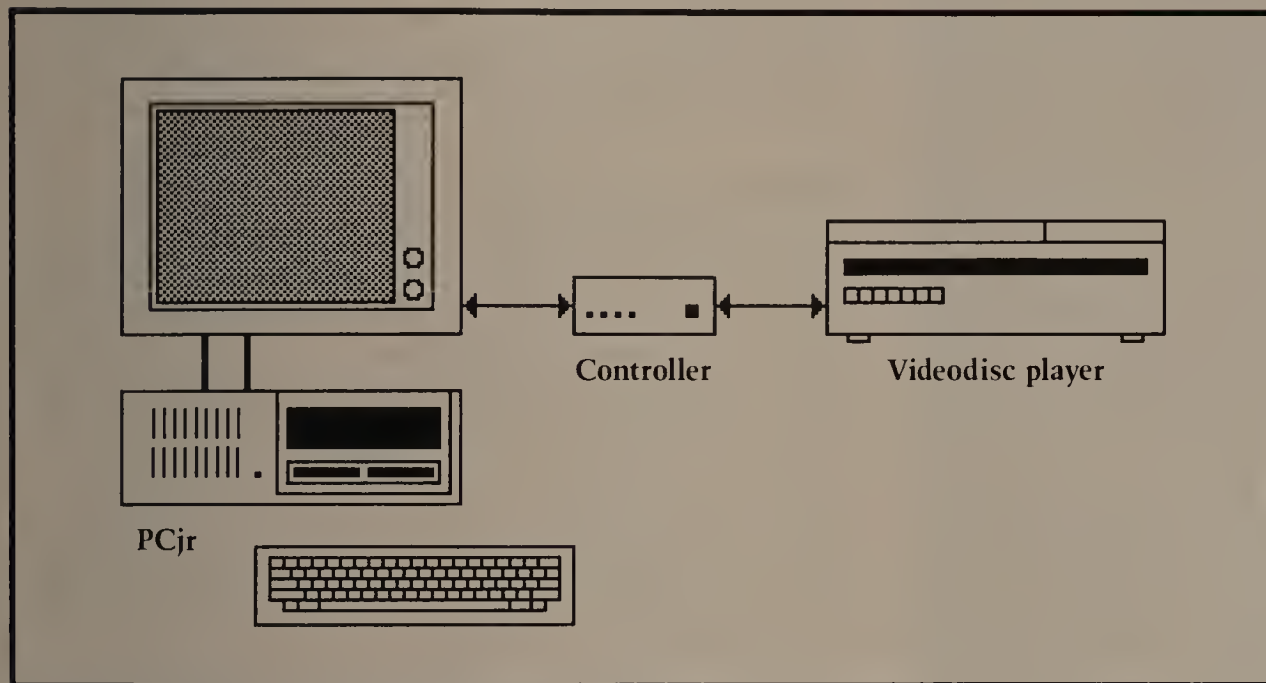


Figure 1: A PCjr and a videodisc player combined with one display

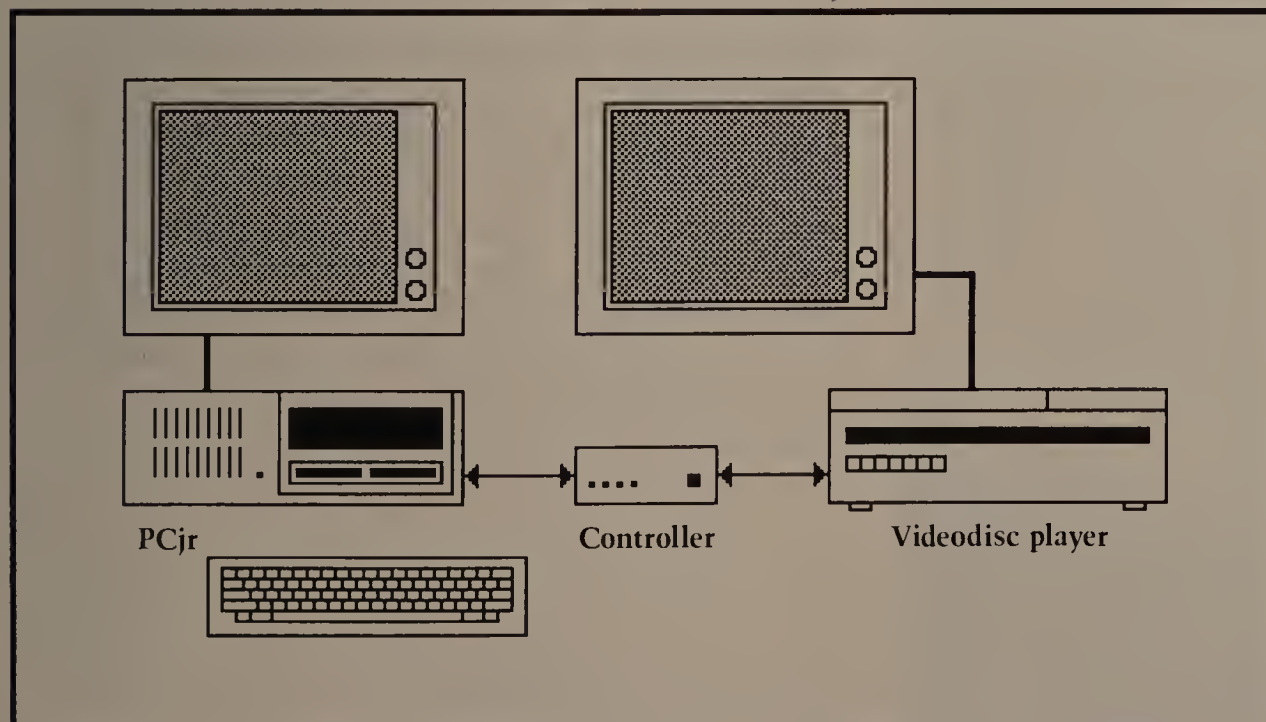


Figure 2: A PCjr and a videodisc player combined with two displays



Video

since merging, or overlaying, video images and computer text or graphics on one screen is difficult. Monitors that permit merging, such as the 12-inch Sony Profeel, are twice as expensive as standard color monitors.

The type of program you are running and the quality of the display dictate which configuration is right for you. If the program is designed to switch between computer text and video segments, you can run it on one display—your TV set, for example. Programs that need two displays running at once or require extensive typing, such as a word processing or spreadsheet tutorial, demand the sort of configuration shown in Figure 2, including, for instance, a TV set and a standard computer monitor.

Software and Video

An interactive training program will be viewed by more than one individual, so a program designer must anticipate how different people will react to the program. Some students grasp concepts and ideas the first time; others need repetition before they clearly understand information. A third group of students may need the information explained in a different way before it makes sense to them, or they may want reinforcement from books or articles that a program refers to. Ideally, all of these people can use the same interactive program.

An astute program designer realizes that there are many paths to the correct answer. Students at different levels can learn the same concepts at their own speeds. An interactive computer-video French program, for example, might ask a student the meaning of the word *poulet*. The program advances to the next question if the student types the correct answer, repeats the video segment of the Parisians discussing their dinner if the response is slightly incorrect, or shows a picture of a chicken and repeats the word *poulet* if the student types a wildly incorrect response. Each one of these possible paths is called a "branch"; any well-planned interactive program will use branching as much as possible to increase its usefulness—and its profitability.

At its simplest you can think of a program branch as a fork in a stream: you are carried one way or the other depending on your action. A more effective program, of course, allows for more than two responses to a question. Instead of merely repeating previous material, the program may present the same informa-

tion differently (see Figure 3). The more interactive a program, the more sophisticated; well-designed interactive programs seem more human than mechanical. Some branches have their own branches that explore certain information or concepts in greater detail before returning to the main theme of the program.

The best interactive educational programs are plotted out with storyboards and scripted like Hollywood films. Besides structuring lessons and anticipating problems students might have with the material, program designers must be aware of and work around the mechanical restrictions of interactive devices.

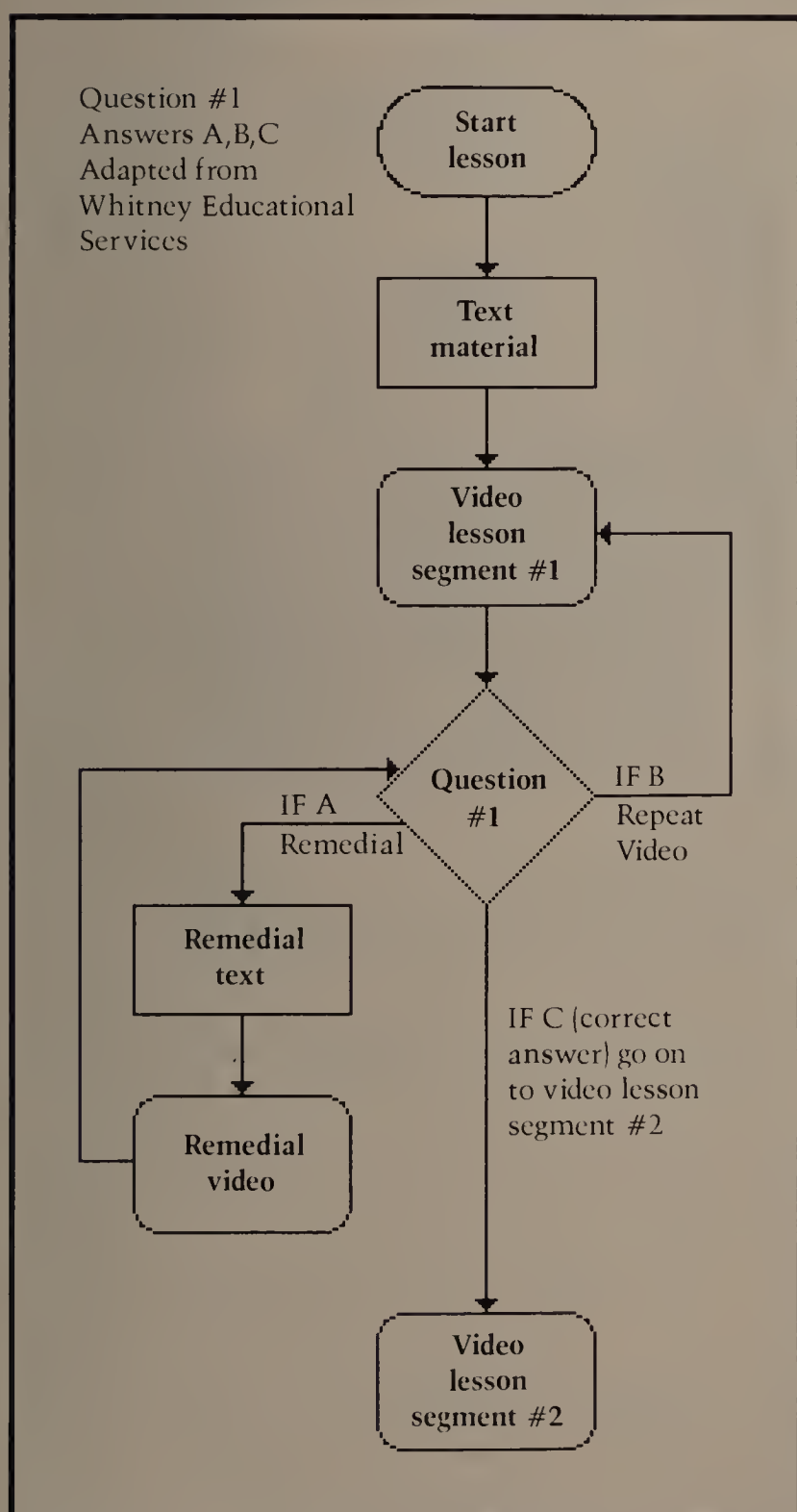


Figure 3: Flow chart of interactive branching

In interactive video programs, video segments are not necessarily played in sequence; some segments are repeated more often than others. An annoying problem of *Dragon's Lair* is the blackout that occurs when the videodisc switches from segment to segment in response to a twist of the joystick. What do students do while a videotape is rewinding or a videodisc player is searching for a specific frame? Instead of displaying a blank screen, carefully designed programs mask this dead time by switching to computer-generated graphics or text while the videotape or videodisc player finds the appropriate video segment. Programs might also refer students to written material in workbooks or textbooks at these times. As videodisc players, which have faster access times than videotape players, get faster and cheaper, these delays may be minimized.

Author, Author

Although the majority of educational computer-video programs are made from scratch with specially filmed video segments, some are made with preexisting video material. A high school with a large videotape library

A teacher can use the episode on the Civil War from Alistair Cooke's television series 'America' to create an interactive lesson for a freshman American history class.

need not ignore this capital investment. Instead, the videotapes can be incorporated into interactive programs by means of an authoring system run on a computer. An authoring system is sophisticated software that lets nonprogrammers create interactive computer-video programs, usually with easily edited videotape.

For example, a high school may have all 13 episodes of Alistair Cooke's television series "America" in its videotape library. With an authoring system a teacher can use the episode on the Civil War to create an interactive lesson for a freshman American History class. The teacher can design the program to

match a course's lesson plan and to direct students to other available material. For instance, a question about battle strategies at Gettysburg could refer students to specific pages in the class's textbook or to a biography of Ulysses S. Grant that is in the high school library.

While the video segment itself cannot be changed, the interactive programs generated by authoring systems can be changed and updated with little trouble. Adding questions or branches to the program gets easier as the teacher becomes more familiar with an authoring system.

Washington Computer Services's *PC/PILOT* is one authoring system that runs on the PCjr. Authoring systems designed for the PC that require 128K or less memory, such as Whitney Educational Services's

Well-designed interactive programs seem more human than mechanical.

Insight-PC, will probably run on the PCjr. To date, manufacturers have not completed testing of PC authoring systems on the PCjr.

The Future

Dragon's Lair and similar games have brought interactive programs out of corporate offices and into arcades. The growing list of tutorials will bring more interactive programs into small businesses and the traditional school video market. The next step—bringing interactive programs into the home—will take a while, but some recent developments suggest that the wait will be short.

Videotape and videodisc players are becoming more sophisticated and cheaper. An estimated 10 million homes in the United States have videotape players, and that number should grow to 40 million by 1990. Many of these homes do or will contain computers, so the home audience is growing.

Coleco paid an estimated \$2 million for the worldwide licensing rights for *Dragon's Lair* and expects to release a floppy disk version of the game for its Adam computer this summer. A Coleco spokesperson

says, "We expect Adam to have interactive videodisc-playing capability sometime in 1984."

Industry rumor also has it that IBM is working on a videodisc project. The rumor is strong enough that some interactive producers are waiting to see what Big Blue has up its sleeve before they start production on interactive programs.

So Dirk, our knight in shining armor, is leading the way. But it will be interesting to see who and what follows our interactive hero.

Katie Seger is an Assistant Editor for PC World.

Universal Video Controller
Allen Communication
140 Lakeside Plaza II
5225 Wiley Post Way
Salt Lake City, UT 84116
801/537-7800
List price: \$995

PC/PILOT
Washington Computer Services
3028 Silvern Ln.
Bellingham, WA 98226
206/734-8248
List price: with single-user license \$100, with
multiuser license \$550
Requirements: 64K, one disk drive

Insight-PC
Whitney Educational Services
1777 Borel Pl. #416
San Mateo, CA 94402
415/341-5818, 415/570-7917
List price: \$990
Requirements: 128K, one disk drive (two
recommended)

See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.

See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.



Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303

I'd like more information

PCW6

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

© 1984 Micro Focus Inc. All Rights Reserved.
LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

*How to program three-voice music
on the PCjr*

Three-Part Harmony

Warren Sirota

The designers of the PCjr endowed their creation with fine musical capabilities. The PCjr contains a "three-voice synthesizer," which enables the computer to play three notes simultaneously, permitting chords and harmonies in musical programs. Of course, the PCjr does not match the rich tones of music synthesizers that professional musicians play, but those synthesizers don't play video games or run applications programs. While the PCjr is not a Stradivarius, it can provide musical entertainment and education.

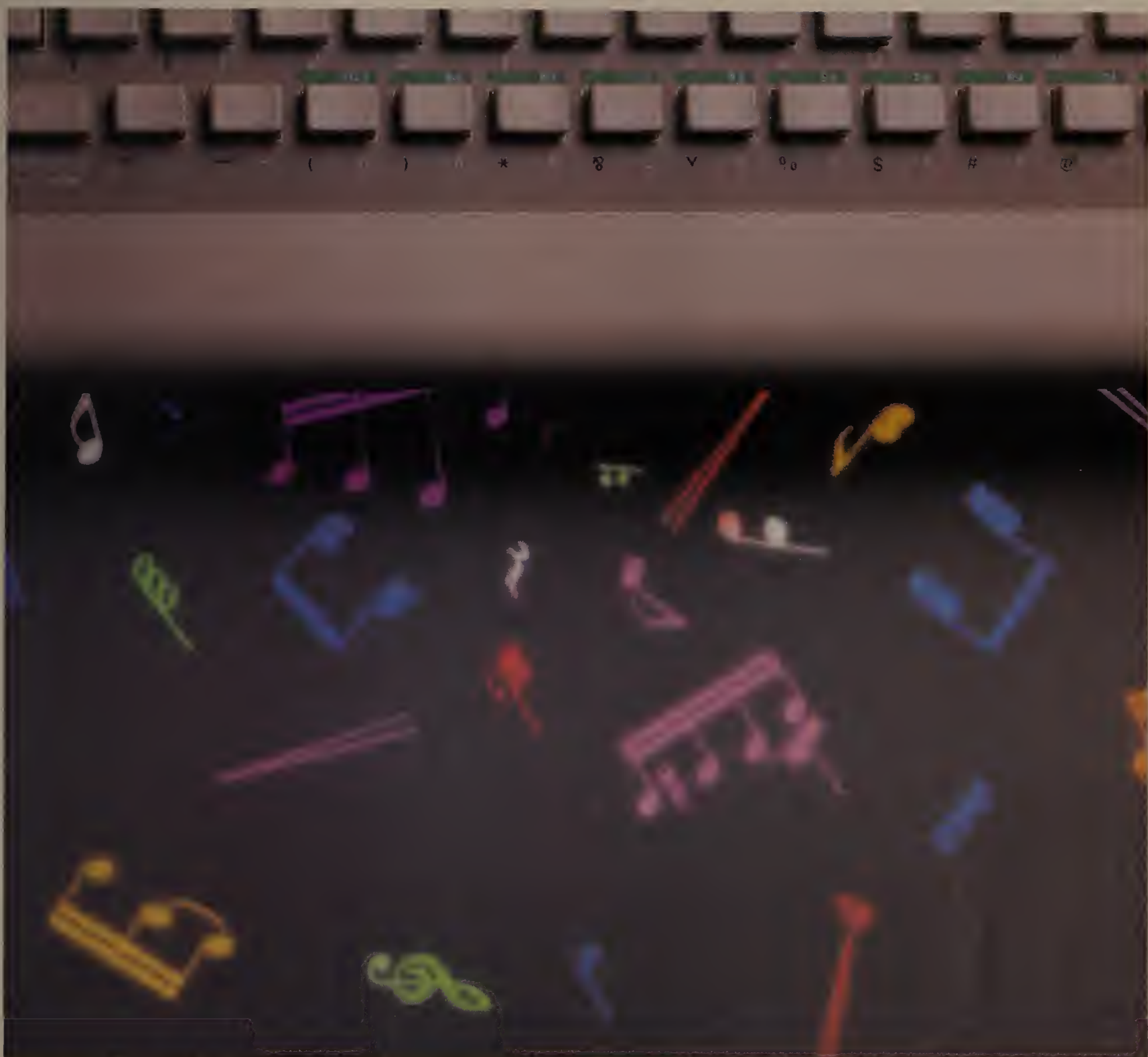
The PLAY statement (see "PCjr Strikes a Chord," *PCW*, Vol. 2, No. 7) is the easiest way to unlock the PCjr's musical talents. The PLAY statement's many options make it a powerful programming instruction. On the PCjr the PLAY statement is only available in Cartridge BASIC, which you must have before you start this music lesson.

A Noteworthy Start

Plug in Cartridge BASIC and turn on the PCjr. The computer loads BASIC and displays copyright and memory information and an 'Ok' on the screen. Type `PLAY "CDE"` and press <Enter>. The PCjr plays the three notes C, D, and E.

You can command the PCjr to play notes A through G in seven octaves. You indicate sharps with either a pound sign or a plus sign. The note F-sharp, for example, is written as either `F#` or `F +`. Flats are indicated by a minus sign, so the note B-flat is written `B-`.

Notes are grouped into octaves; each PCjr octave begins at C and continues up the scale to the note B. The computer has a range of seven octaves; octave 0 (zero) is the lowest octave, and octave 6 is the highest. The PCjr assumes that notes are in the default octave, octave 4, unless you specify another octave. To play notes in octave 5 instead of octave 4, for example, you type `PLAY "05 CDE"`. (Type the letter O, for octave, not the number zero.)



You can also specify the octave with programming shorthand. The "greater than" symbol raises the octave, and the "less than" symbol lowers the octave. For example, if you type `PLAY "CD<E"`, the last note is much lower than the first two notes, because the E is played in a lower octave than the C and the D.

A BASIC Record Player

Now that you have an idea of the PCjr's range with its internal speaker, you should hook up the computer to a stereo system to take full advantage of the PCjr's three-voice capabilities. (See "Hook Up PCjr to Your Stereo System" in "PCjr Strikes a Chord," *PCW*, Vol. 2, No. 7.) If your television set serves as the PCjr monitor, the TV speaker provides the three-part voice.

Listing 1 is a three-voice composition for the PCjr. The program can be thought of as both record player and record. Statements 10 through 110 constitute the "record player"; they tell the computer to read and play music specified in the DATA statements that follow them. The remainder of the program—in this case DATA statements 1000 to 1120—constitutes the "record"; it translates the tune into instructions that the PLAY statement can understand. When you want to play a different tune, change the DATA statements but leave statements 10 through 110 intact.

Look at the record player part of the program. Line 10, 'SOUND ON', shuts off the PCjr's internal speaker and directs further audio signals out through an external speaker. Be sure that the volume control of the TV or the stereo is

```

9  '* Turn on the external speaker
10 SOUND ON
19 '* Set the tempo in all three voices
20 READ TEMPO$
30 PLAY TEMPO$, TEMPO$, TEMPO$
39 '* Read number of measures & rounds
40 READ MEASURES, REPEATS
50 FOR COUNT=1 TO REPEATS
60   FOR MEASURE=1 TO MEASURES
69     '* Read a measure
70     READ A$, B$, C$
79     '* Play the measure
80     PLAY A$, B$, C$
90   NEXT MEASURE
99   '* Set data pointer to start of 1st measure
100  RESTORE 1010
110 NEXT COUNT
1000 DATA "T150", 12, 2
1010 DATA "O3 D1", "O4 D4.C#8 L4DE", "P1"
1020 DATA "D2 D2", "F D2 F", "P4O3A2>D4"
1030 DATA "L4 >C<AB-A8G8", "L2 ED", "P1"
1040 DATA "A2 D2", "C#P4 F4", "P2.D4"
1050 DATA ">C<AB- G", "ED", "P1"
1060 DATA "E2.E", "E4.E8<A4>E4", "C#4.C#8P4C#4"
1070 DATA "L2 DD", "L8 DC#DE L4 DE", "P1"
1080 DATA "DD", "F D2 F", "P4<A2>D4"
1090 DATA "L4 >C<AB-G", "E2D2", "P1"
1100 DATA "A2.A", "C#4.D8 L4 ED", "P1"
1110 DATA "L4 AF#GA", "C#DDC#", "P1"
1120 DATA "D2.D", "F#4.F#8<A>F#", "D4.D8P4D4"

```

Listing 1: Branle Simple program

turned up so that you can hear the computer music. Lines 20 and 30 set the tempo—the number of beats per minute. Line 30 contains three TEMPO commands because BASIC requires that you tell each voice what tempo to play. This BASIC programming quirk allows avant-garde experimenters to write interesting musical compositions by setting each of the computer's three voices at a different tempo. However, for conventional western music you should set all the tempos at the same number. The PCjr can vary the tempo from 32 to 255 beats per minute. Since the PCjr can play up to 16 notes per beat, the computer can play as fast as 68 notes per sec-

ond in all three voices—a musical feat that even Eric Clapton might envy. The next 12 lines of the program instruct the PCjr to read and play each measure and to repeat the entire piece as many times as the DATA statements instruct.

I Hear a Melody

Now it's time to get down to transcribing music. Let's start with a funky little number from the sixteenth century called "Branle Simple" (the Branle was a type of dance popular during the period). The piece was written for the guitar by French composer Adrian

Branle Simple Adrian Le Roy, 1551

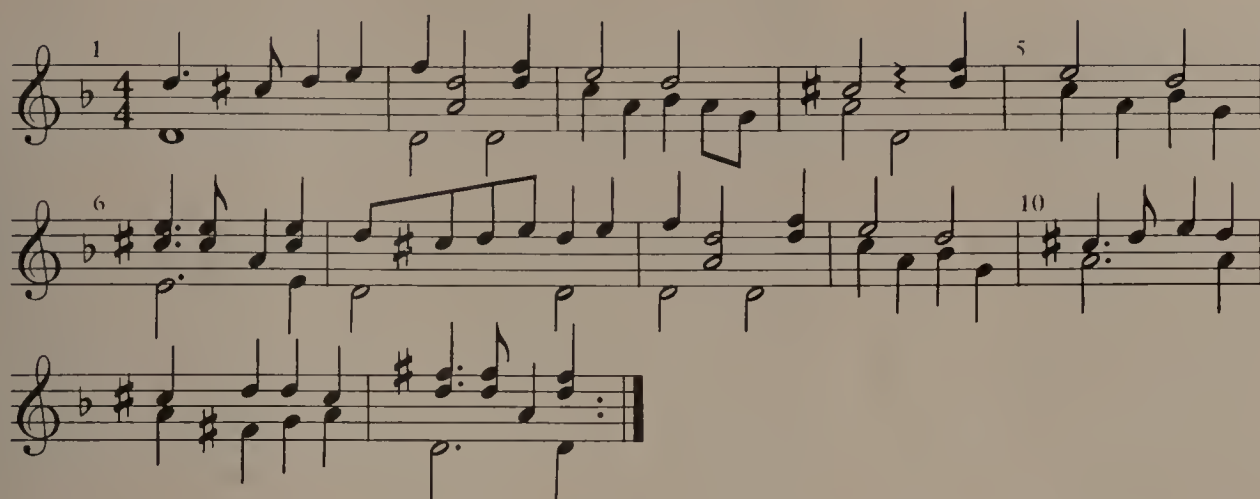


Figure 1: A sixteenth-century dance

Le Roy. It is appropriate for the PCjr, for as Figure 1 shows, no more than three notes are played at any one time (notes that are played simultaneously are printed one above the other on the staff). If you don't know anything about reading music, read "How to Read Music—A Crash Course" before proceeding.

The Branle contains three voices, or lines—the melody line, the harmony line, and the bass line. The melody line has the highest notes of the three voices, while the bass line, with the lowest notes, provides the Branle's rhythmic foundation. In this piece the harmony line—the middle notes—provides occasional support for the melody and appears only in even-numbered measures. For no reason other than for convenience of presentation, I have programmed the bass line as voice 1, the melody line as voice 2, and the harmony line as voice 3. You can number the voices differently if you choose.

The first DATA statement of the program must contain the tempo of the piece, the number of measures in the tune, and the number of times the piece is repeated; the information must be written in that order. The tempo is written as Tn where T signifies tempo and n

The program can be thought of as both record player and record.

is a variable that stands for the number of beats per minute; how many measures and repetitions the piece has is designated by numbers. A good tempo for this piece is 150 beats per minute. The piece has 12 measures, and we want to play the whole piece twice. Hence, our first DATA statement is '1000 DATA "T150", 12, 2'.

The other DATA statements each contain one measure's worth of notes for each voice in the form of three character strings separated by commas. The first string

in each statement represents the notes that are played by the first voice, the second string represents the second voice, and the third string represents the third voice. You should number the DATA statements so that measure 1 appears in statement 1010, measure 2 in statement 1020, measure 3 in statement 1030, and so on. This numbering makes it easier for you to keep track of the measures while transcribing a piece of music and helps you correct mistakes you make when typing in the program. If you use different line numbers, you must change the RESTORE reference (in line 100) to the line number of the DATA statement containing the first measure.

Coding the first measure requires virtually all of the PLAY statement instructions, so it serves as a good musical transcription example. Don't be intimidated by the PLAY statement details. I translated my sheet music into the DATA statements in less than an hour, and this was the first piece I transcribed for the PCjr; it would have taken me nearly as long to copy the piece by hand.

To play a note on the PCjr you need to tell the computer three things: the note's octave, its name, and its length. Look at the first measure of Figure 1. The first note for the bass voice is a whole note, D. In program statement 1010, `""03 D1""` tells the PCjr that the note is in octave 3, is a D, and plays for the entire measure.

You specify note length by following the name of each note (in this case D) with a number from 1 to 64. The Branle is written in 4/4 time, so if the length of the note is a number, n , then the note will be played for $4/n$ beats. The number 1 indicates a whole note, the number 2 a half note, the number 4 a quarter note, and so on. The number 3 may also be used, although strictly speaking a "third note" doesn't exist. If you specify `"D3"`, the note D plays for a third of a measure (for the musicians among you, that is one note of a triplet of half notes).

Look at the second string in statement 1010, `""04 D4.C#8 L4DE""`. This string describes the melody line (voice 2) of the first measure; it is more complicated than the bass voice string because it has to describe four notes instead of only one. The first note of the melody voice is D in octave 4, and it lasts for one and a half beats. It is a "dotted quarter note"; you indicate its length with a 4, as with all quarter notes, followed by a dot, or a period. Musicians should appreciate the naturalness of this programming notation since it mirrors musical notation. When you write the second note of the melody line, you don't have to specify the octave. The PCjr continues to play in the octave chosen

How to Read Music—A Crash Course

Beethoven and Mozart would probably chide anyone who tried to explain music notation in this short a space. However, this crash course should be enough to get you started with musical programming.

The Staff

A music staff is a set of five parallel lines on which music is written. Figure A shows a staff with the names and positions of notes. The symbol at the beginning is called the treble clef, or the G clef. Its curlicues always center around the second line from the bottom of the staff and indicate that this line represents the note G. If you read from left to right, the notes go up the scale—that is, each note is higher than the one preceding it. Four notes—D, E, F, and G—appear on the staff twice. The repeated notes are an octave apart from their counterparts.

Measures, Lengths, and Signatures

Music is divided into units called measures, separated by vertical lines on the staff. The two numbers that appear at the beginning of a piece of

music and look like a fraction are called the time signature. The upper number tells you how many beats are in a measure, and the lower number tells you which type of note gets a single beat. In the most common time signature, 4/4, each measure has four beats, and quarter notes get one beat each. In the interest of clarity this article refers only to 4/4 time (see Table A).

A dot following a note means that you increase its length 50 percent. For example, since half notes normally receive two beats, dotted half notes receive three beats. Similarly, dotted quarter notes get one and a half beats.

The key signature tells what key the music is written in; it is shown by sharps and flats at the beginning of each line. In "Branle Simple," for instance, a flat ($\flat$) is marked on the B line of the staff. This means that you play every B as B-flat. This musical rule can be overridden within a piece by placing a natural sign ($\natural$) in front of any note that should not be sharpened or flattened.

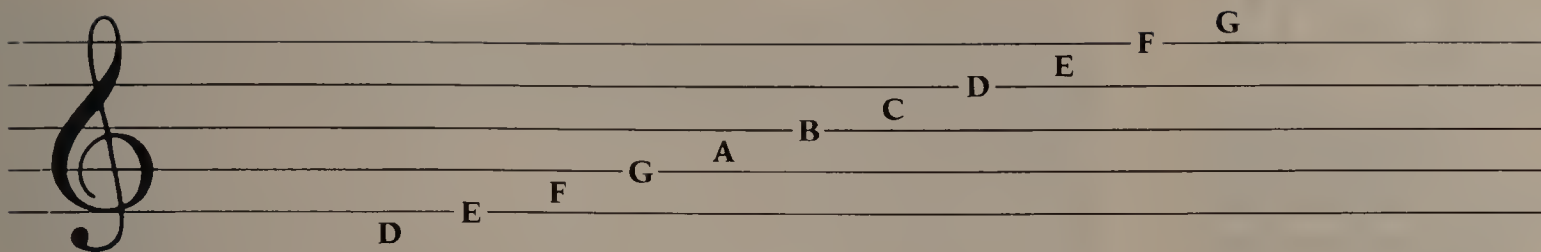


Figure A: The notes on the treble clef

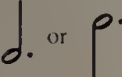
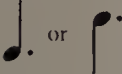
Note	Note Name	Number of Beats
	Whole note	4
 or 	Dotted half note	3
 or 	Half note	2
 or 	Dotted quarter note	1½
 or 	Quarter note	1
 or  or 	Eighth note(s)	½
 or  or 	Sixteenth note(s)	¼
 or  or 	Thirty-second note(s)	⅛
 or  or 	Sixty-fourth note(s)	⅙

Table A: The shapes of notes, their names, and their durations under 4/4 time

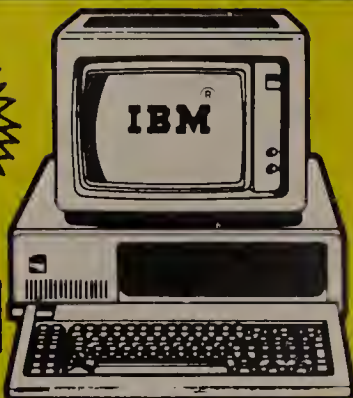
COMPU

MAIL

FREE
Printer Stand
with
System Order

★ indicates NEW
LOWER PRICES

AD#786



PRICE WAR

★ IBM PC 64K, Two disk drives 360K each,
Drive Controller and Keyboard\$2,199

WE CUSTOMIZE IBM PC SYSTEMS

★ IBM PC with 128K, one floppy Drive, Keyboard
10 MB Hard Disk with Controller\$3,199

TAVA PC	CALL
Computer Accessories Power Director	\$109
NEW QUADRAM Quadboard OK	\$219
★ AST SIX PAK PLUS with 64K	\$266
AST I/O Plus with Clock & Serial Port	\$129
ORCHID TECH PCnetPLUS	CALL
TEAC 55B-slimline DSDD	\$179
TEAC 55F-slimline DSQD	\$249
CONTROL DATA - full height	\$219
TANDON 100-2	\$209
MAYNARD 10MB - WS-1 with EPROM	\$999
MAYNARD 10MB - WS-2 with EPROM	\$1,199
TALLGRASS TECH Hard Disk Systems	CALL
★ PGS HX-12	\$466
PGS MAX-12 Amber	\$179
PGS SR-12	\$599
AMDEK 300	\$149
SANTA CLARA SYSTEMS PCterminal	CALL
EPSON FX-80	\$529
★ EPSON FX-100	\$666
OKIDATA Micraline 92 P	\$429
OKIDATA Micraline 93 P	\$699
PLUG 'N PLAY for OKIDATA	\$49
Printer Stand Regular	\$25
Parallel Printer Cable	\$30
★ NEC SPINWRITER 2050	\$888
★ NEC SPINWRITER 3550	\$1,666
★ NEC SPINWRITER 7730	\$1,888
PERSYST Color Graphics Card	\$209
QUADRAM Quad Color I	\$209
QUADRAM Quad Color II Upgrade	\$209
MYLEX Multidisplay Card	\$499
STB GRAPHIX PLUS	\$399
TECMAR Graphics Master	\$499
AST MonoGraphPlus with Clock, Serial & PP	\$499
HERCULES Graphics Card	\$369
Tseng Labs UltraPAK	\$549
★ PLANTRONICS ColorPlus	\$366
PARADISE Multidisplay Card	\$379
MICROCOM ERA 2 Internal Modem w/Software	\$349
HAYES Smartmodem 1200 B	\$399
HAYES Smartmodem 1200	\$499
EVEREX Graphics Edge	\$399



COD NO SURCHARGE VISA & MC 3% AMEX 5%

COMPUMAIL

805-498-6635

2509 THOUSAND OAKS BLVD., THOUSAND OAKS, CA 91362

Circle 273 on reader service card

Programming

for the previous note until the octave is changed. (This rule is true for all three voices, but each voice needs an initial octave setting.) So the second note, a C-sharp eighth note, is written 'C#8'.

The final two notes in the first measure are both quarter notes. Instead of specifying their lengths individually, you can again use the PLAY statement's shorthand. 'L4' sets the default note length in this voice as a quarter note. You can change the default setting by issu-

The programming notation mirrors musical notation.

ing another L command, such as L2, which sets the default note length as a half note. The remainder of the second string, 'DE', tells the PCjr the names of two notes. Since no length is specified, the notes will last for one beat each.

In addition to telling the PCjr when to play you must be able to tell the computer when not to play. As mentioned earlier the third voice in this piece has few notes. However, these notes must play at the right times, or the music would resemble a lesser-known Charles Ives piece. In order to prevent such unplanned dissonance, you must tell the third voice to pause for a specified number of beats when it has no music to play. This programming is just like telling the computer to play a note for a certain number of beats except that you use the letter *P*, for pause, instead of a note name. The third string in the first measure,

"P1", tells the third voice to be silent for the length of a whole note, or one measure.

It is easier to transcribe music in 4/4 time than in some other time signatures because the PLAY statement always assumes that quarter notes get a single beat. However, you can overcome this programming limitation. When you transcribe a musical piece written in another time signature, you still put one measure's worth of information into each DATA statement; in 3/8 time, for example, you put three beats in each measure. In 3/8 time, eighth notes, rather than quarter notes, receive a single beat, but when you transcribe the piece as written, the PCjr plays the music twice as fast as it should be played. To slow the music down, you halve the tempo of the piece. The PCjr will still play each eighth note for a half beat, but the new tempo setting will make the eighth notes as long as a full beat at the original tempo.

Now that you have the foundation for three-voice programming, you should be able to understand the program's DATA statements as well as write data statements for other musical pieces. Type in the program and let the PCjr transport you back to the sixteenth century. And if the Branle is too sedate, you can always program a break dancing tune.

Warren Sirota is a member of the consulting firm Midway Software, of Berkeley, California. He is also a member of the Electric Guitar Quartet, a classical music group.

What IBM® forgot...



Second floppy-disk drive

Sockets for 256K RAM

Enhanced version of
DOS 2.1

Master power module

Optional clock/calendar
and mouse-port

Falcon remembered.

Introducing the *jr extender* floppy disk expansion system for the IBM PCjr.

Falcon Technology remembers what computers are *really* used for. Entertainment, sure. Balancing a checkbook, maybe. But the bulk of the PC's in the marketplace today are used in business-type applications requiring more than ROM cartridges, a single disk drive, or just 128K of random access memory.

Enter *jr extender* — the second disk drive and space for additional RAM that IBM should have included in the first place.

When you attach the *jr extender* to the side of the PCjr, you have the capability to run the most popular programs written for the IBM PC. With a second 360K double-sided disk drive and space for 256K of RAM, a whole world of professional-level PC software is suddenly available to you.

Exciting options

You can also add an optional clock/calendar and mouse-port card to your *jr extender* system. This single-card option allows a mouse to be used with the PCjr without surrendering its serial port. The clock/calendar feature eliminates the need to enter date and time when the computer is turned on and can be used to automatically switch your PCjr on and off at preset times.

Used in conjunction with the clock/mouse option, the optional two-button mouse includes mouse control software. You'll enjoy the ease and convenience of using a mouse with programs such as Microsoft® WORD, Multiplan®, Lotus 1-2-3, and Wordstar®.

The Falcon Technology *jr extender* basic unit retails for \$995 and includes:

- 360K double-sided floppy disk drive
- Sockets for 256K of RAM
- Enhanced version of DOS 2.1
- Master power module
- I/O slot for the optional clock and mouse-port card
- General-purpose expansion slot
- Ninety-day limited warranty

Smart money

Put the full power of an IBM PC to work for you at **significant savings**. Combine a PCjr with a Falcon Technology *jr extender* floppy disk expansion system and make your jr. everything it was **meant** to be.

Call us today for your nearest Falcon dealer.

1-800-722-2510

In Washington state: (206) 251-8282

FALCON

Falcon Technology, Inc.

6644 196th Street, Suite T-101
Kent, Washington 98032

215

IBM is a registered trademark of International Business Machines, Inc.
Microsoft and Multiplan are registered trademarks of Microsoft, Corporation.
Wordstar is a registered trademark of MicroPro International Corporation.

Circle 643 on reader service card

Enhancing your PCjr is as easy as finding the right slots.

Plug In More Power

Katie Seger

A common trait among computer owners is the desire for more—more memory, more options, more power. Whether you start off with the entry or the enhanced PCjr model, you will probably want to upgrade your system by adding one or more expansion boards. Unlike the PC, which requires that you reset switches on the motherboard (the main system circuit

board into which other boards can be inserted) when you install certain expansion boards in the system unit, the PCjr's circuitry is designed to accept additional boards without special modification. So adding a disk drive and its controller board, an internal modem, and a memory and display expansion board can be a relatively simple, do-it-yourself task. If you're not confident of your ability to perform such a task safely, you can have the options installed by a dealer or a qualified technician. This article takes you step-by-step through installing these options. The only tool you need is a flathead screwdriver.



Figure 1. Turn your PCjr off. Disconnect the power supply cord and transformer, the monitor and attachment cable, and any other cables or cords attached to the system unit. Place the system unit on a flat work surface and turn it so the back panel is facing you. Gently pry open the system unit cover with the screwdriver. The PCjr has three notches on the back panel for this purpose.

Figure 2. Remove the internal power supply board by gently pulling up both ends of the board.

Figure 3. Push out the removable plastic faceplate above the ROM cartridge slots. This opening is for the half-height disk drive.



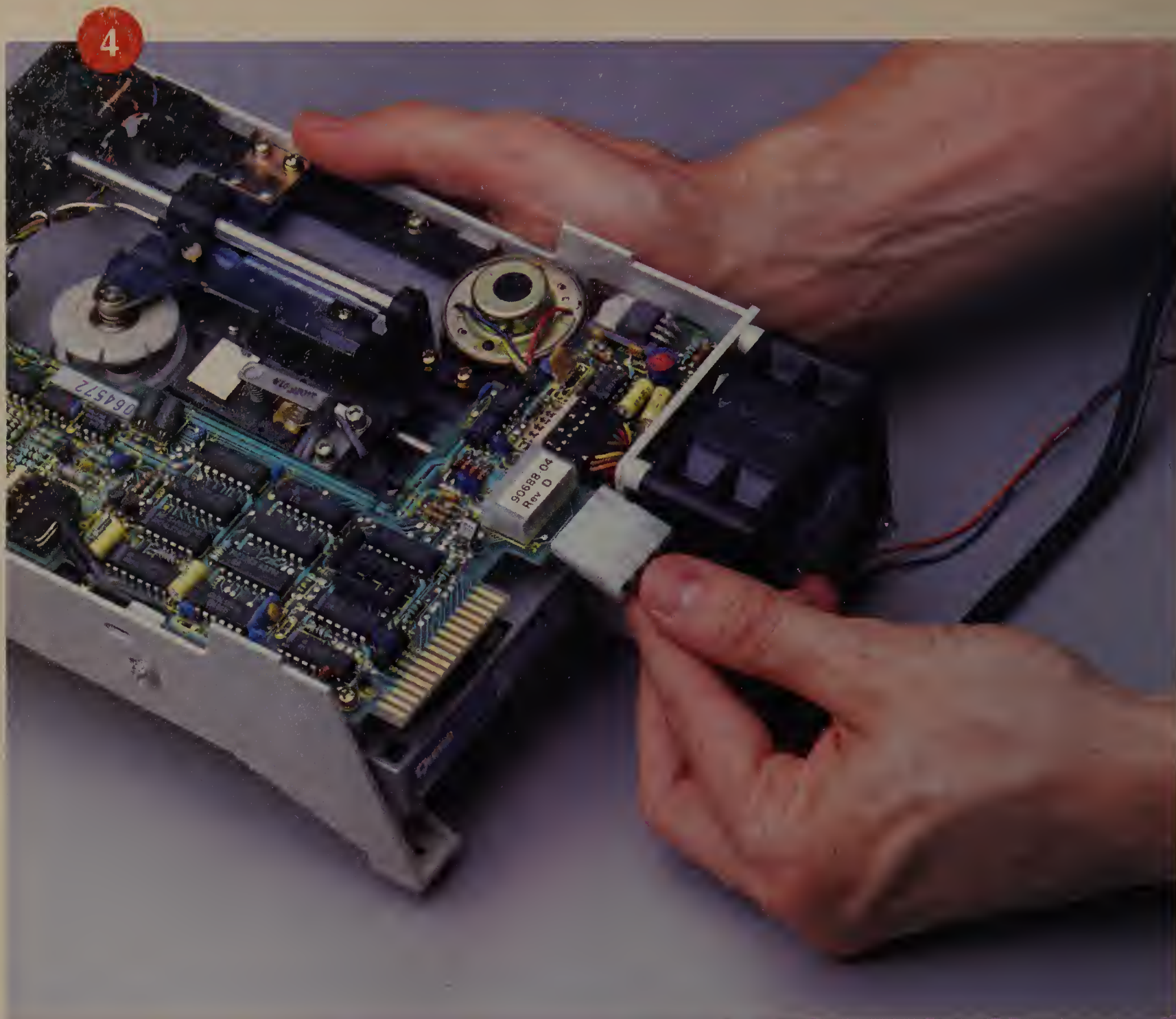


Figure 4. Plug the black disk drive power cable into the four-prong connector on the disk drive. The connector is next to the disk drive's fan.

Figure 5. Put the power cable and the two-wire fan cord underneath the disk drive. Slide the drive over the ROM cartridge slots and into the front panel drive opening. The fit should be snug. Align the disk drive's two plastic

mounting pins with the two holes that are on the computer's motherboard. Make sure that the disk drive power cable and wires are under the drive but away from the mounting pins, then press down on the disk drive's plastic sides to secure the drive to the motherboard. The drive should snap into place.





Figure 6. Plug the disk drive power cable and the two-wire fan cord into the internal power supply board.

Figure 7. Plug the internal power supply board back into its slot. Internal plastic board guides near the back of the system unit will help you position the board.

Figure 8. Plug the straight end of the disk drive signal cable into the disk drive controller board.

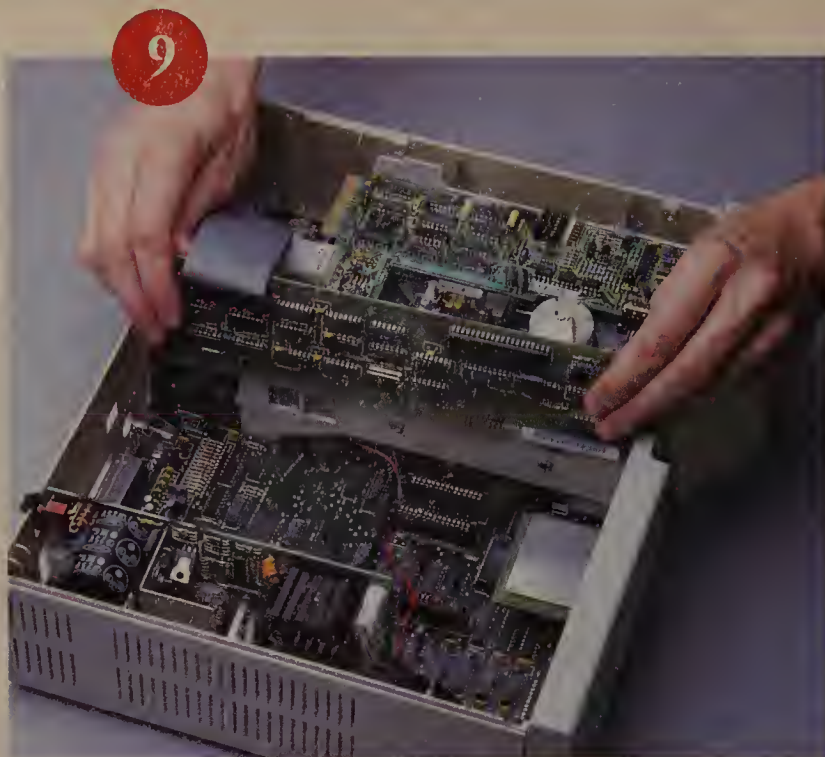


Figure 9. The PCjr has three expansion slots on its motherboard. The slot next to the disk drive is dedicated to the disk drive controller board. Plug the controller board into this slot, but be sure that the board is not crimping the disk drive power cable or fan cord. The controller board, like the two other IBM expansion boards, has notches that provide safe passage for these wires.

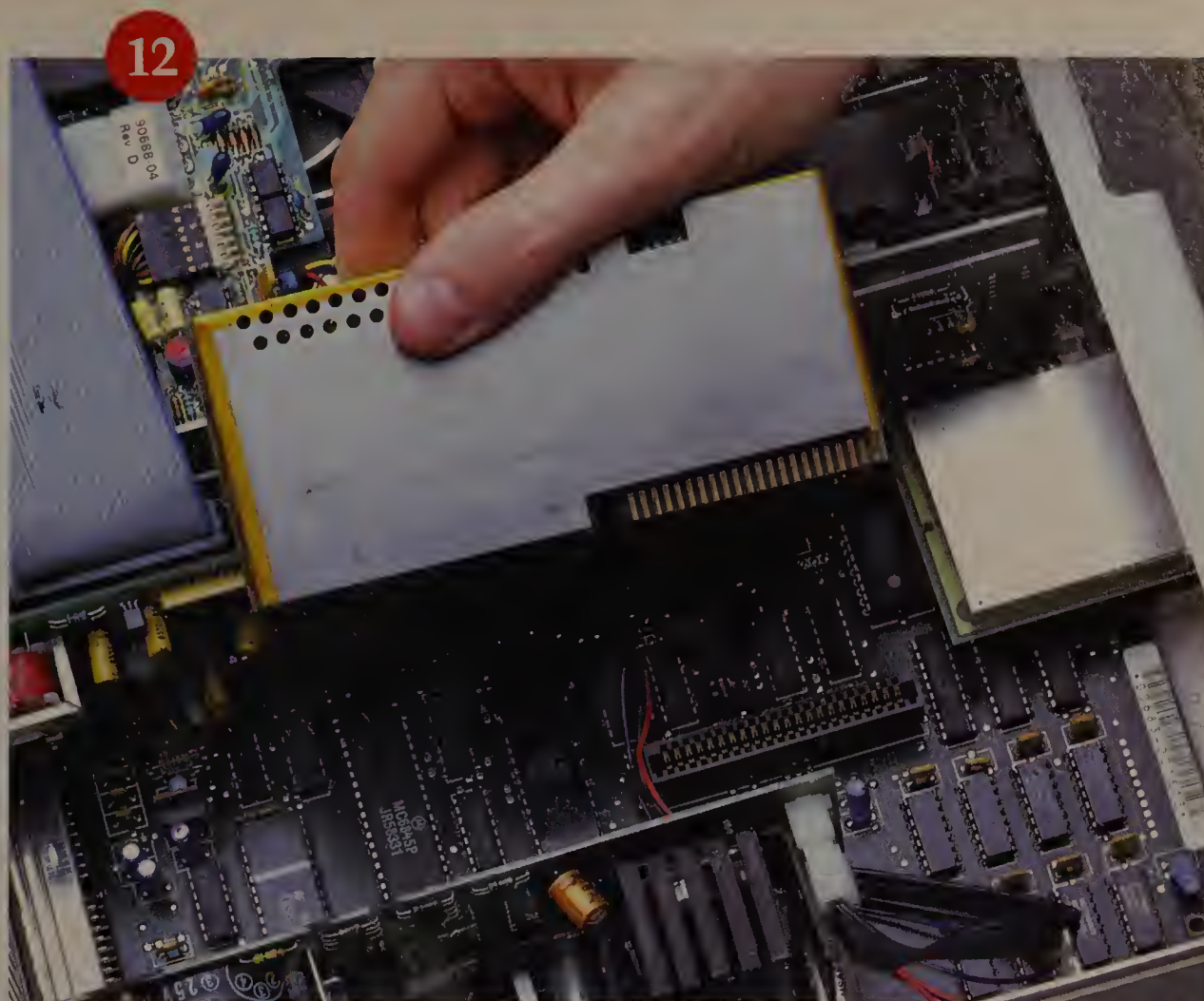
Figure 10. Attach the folded end of the gray and blue signal cable to the connector on the disk drive.

Figure 11. The slot next to the disk drive board is reserved for the internal modem. Plug the modem into the slot. The board aligns with the M (for modem) socket on the system unit's back panel.



Figure 12. The remaining slot is the longest of the three slots and is for the memory and display expansion board. This board is encased in a metal covering. Once again, be careful not to crimp the disk drive cable and wires when you plug in the board.

Figure 13. Your job is almost done. Slide the system unit cover back into place. Gently press down on the back to secure the cover to the system unit. Reattach the power transformer and monitor, turn on the PCjr, and test out your improved machine.

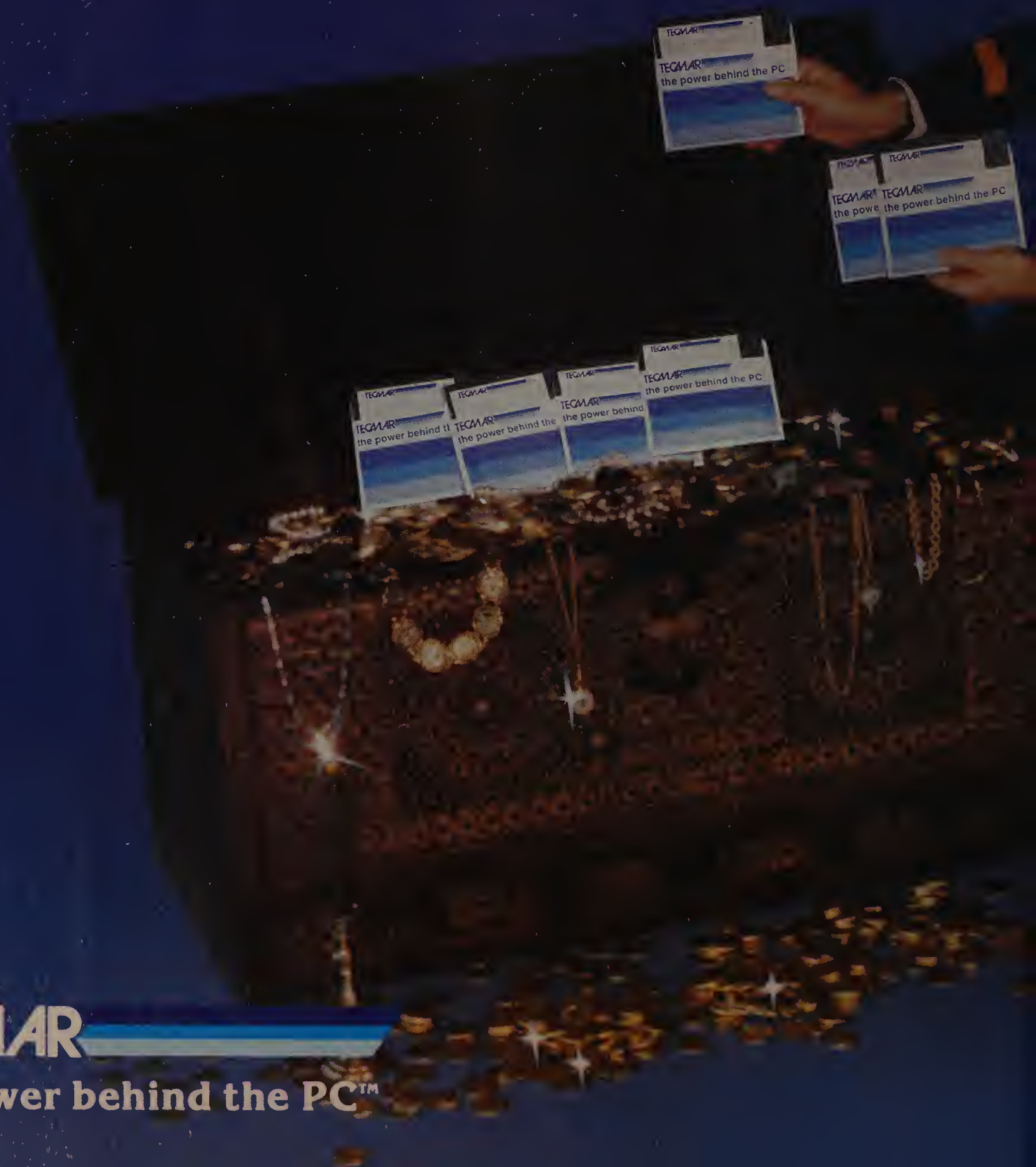


Your enhanced PCjr now has 128K RAM and can display 80 columns of text and graphics. The computer's new disk drive lets you run the disk-based games or applications programs that work on the PCjr. The internal modem (along with a communications program) gives you the opportunity to telecommunicate with other computer owners near and far.

Your handiwork took less than half an hour. That's a lot of computer power for only 30 minutes of effort.

Katie Seger is an Assistant Editor for PC World.

Treasure ChestTM of Software *jr*CaptainTM and 1stMATE



TECMAR
the power behind the PCTM

with Tecmar's CaptainTM, multifunction boards



Your PC can finally do all those wonderful things you've dreamed about — with the Treasure Chest of Software. Eliminate the need for many desk top accessories when you discover Tecmar's new easy to use software technology. With the press of a key you access many Treasure Chest programs without having to exit from a program you are now using. This Treasure Chest of Software gives your PC more power for:

Information Management

- Calculator
- Sorting Program
- Electronic Rolodex*
- Mailing List
- Electronic Notepad
- Forms Generator - create letters, labels & reports

Time Management

- Appointment Alert
- Calendar Generator
- Automatic Time and Date

System Improvements

- Background Printing - frees PC for other work
- Disk Simulator in RAM

Hardware Diagnostics

- Memory Diagnostics
- Printer Diagnostics
- Clock-Calendar Diagnostics

Information Security

- Confidential File Coding

Use at Home

- Checkbook Balancer
- Inventory Management
- Banner Generator - prints letters 4.5 inches tall
- Tic-Tac-Toe
- and more !

INTRODUCTORY OFFER

*Rolodex is a trademark of The Rolodex Corp.

You'll never want to turn your computer off once you experience the ease of use, efficiency and enjoyment of the Treasure Chest of Software.

For the IBM PC: Captain & 1stMATE



- 0 to 384 KBytes of Memory on the Captain Board
- 0 to 256 KBytes of Memory on the 1stMATE Board
- Clock-Calendar with battery
- Serial Communications Port
- Parallel Printer Port
- Treasure Chest of Software

for the PCjr: the jrCaptain



- 0 to 128 KBytes of Memory
- Upgrade to 512 KBytes with addition of jrCadet Board
- Clock-Calendar with battery
- Parallel Printer Port
- Treasure Chest of Software

Tecmar, Inc. 6225 Cochran Road Solon (Cleveland), Ohio 44139-3377

Phone:(216)349-0600 Telex:466692

Circle 190 on reader service card

The truth about information management:

The Knowledge Manager beats dBASE over 250 ways.

"... the leading seller is no longer the best."

You get more from the Knowledge Manager. Relational data management, ad hoc queries (like IBM's SQL DS), spreadsheet, math and statistics, printed forms management, screen I/O management, a full-scale programming language. All for less than the list price of dBASE. Plus you can now get a text processor, a forms painter, color graphics and a run-time version.

Time (in minutes) to sort* a two-field record on one numeric field.

Records	dBASE II	KnowledgeMan
1,000	6.15	5.38
2,000	14.93	11.13
5,000	64.16	33.73
10,000	205.50	69.53

*K-MAN V1.05, dBASE II V2.3D, IBM XT, 256K RAM, heavily populated directory.

All completely integrated: So you can do just about anything you wish. Like financial modeling, order entry, job costing or decision support.

DATA MANAGEMENT

Tables open concurrently
Fields per record (max)
Supports virtual fields
Records per table (max)
Characters per table (max)
Index keys per index key (max)
Characters per password
Encryption, passwords
Read/write protection
Fields defined with edit pictures
Create/Modify records directly from spreadsheet
Table sorting on multiple fields

AD HOC INQUIRY

Query multiple tables with a single command
Query syntax like IBM's relational SQL/DS
Supports full wildcard matching
Supports the IN operator
Supports UNIQUE table items
Dynamic output editing
Multi-field control break groupings

SPREADSHEET ANALYSIS

Spreadsheet size
Cells defined in terms of
Traditional formulas
Data management operations
Entire programs
Spreadsheet can be built/invoked within any program
Interactive spreadsheet evaluation with multi-color forms

FORMS MANAGEMENT

Form-at-a-time processing commands for screen I/O and printer output
Multiple color blacks per form
Special effects for each form element
Blinking, reverse video, low intensity, bell, colors
Form-oriented record creation and browsing

PROGRAMMING LANGUAGE

Numeric functions:
Absolute value, exponentiation, logs, trigonometric functions, random number generator, etc
Working variables:
Maximum number
Maximum length
Arrays (1-dimensional)
Arrays (2-dimensional)
If-Then-Else, While-Do, Test-Case
Maximum levels of procedure nesting
Maximum parameters per procedure
Program encryption

Entries are based on documentation and other vendor information and are believed to be accurate but are not guaranteed
1984 Micro Data Base Systems, Inc.

**KNOWLEDGE
man**

KnowledgeMan is a trademark of Micro Data Base Systems, Inc., dBASE II of Ashton-Tate, SQL/DS of IBM.
Dealer inquiries invited.

Please send me:

- ☐ Free feature-by-feature comparison
- ☐ Forms painter and graphics information and pricing*
- ☐ Run-time package information and pricing*

*Forms painter, graphics and run-time package are available as optional components.

- ☐ Please accept my order for the Knowledge Manager \$500.00
- ☐ Shipping and Handling† 10.00
(Indiana residents must add 5% sales tax—\$25.00)

Machine: _____

Operating Systems:

- ☐ PC DOS ☐ MSDOS ☐ CP/M-86

Disk Format:

- ☐ 8" IBM-3740 SS/SD
- ☐ 5 1/4" IBM PC SS
- ☐ 5 1/4" Victor/Sirius
- ☐ 5 1/4" DEC Rainbow

†Add \$20.00 if outside U.S., Canada or Mexico

192K RAM required, 500K mass storage suggested.

- ☐ Check or money order enclosed (must be drawn from U.S. bank in U.S. currency)

MasterCard No. _____

VISA No. _____

American Express No. _____

Expiration Date _____

Bank No. (if M.C.) _____

Signature _____

VISA, MasterCard and American Express orders may be placed by phone (317) 463-2581.

Name _____

Title _____

Company _____

Phone (____) _____

Address _____

City _____

State _____ Zip _____

Send To:



MDBS/Consumer Products
P.O. Box 248
Lafayette, IN 47902
Phone: (317) 463-2581
Telex: 209147 ISE UR

Or Contact Your Local Dealer.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE
Current release is 1.06 as of 4/1/84.



What if . . . your software gets too soft?

You need software insurance.

Diskettes are fragile, and when a protected program is damaged, the results are expensive and inconvenient. If you have a backup diskette, though, you can have your Apple, IBM or compatible computer back on line within seconds . . . affordably. That's software insurance.

Copy II Plus (Apple][,][Plus, //e)

This is the most widely used backup program for the Apple. Rated as "one of the best software buys of the year" by *InCider* magazine, its simple menu puts nearly every disk command at your fingertips. The manual, with more than 70 pages, describes protection schemes, and our **Backup Book™** lists simple instructions for backing up over 300 popular programs. A new version is now available that is easier to use and more powerful than before. Best of all, Copy II Plus is still only \$39.95.

WildCard 2 (Apple][,][Plus, //e)

Designed by us and produced by Eastside Software, WildCard 2 is the easiest-to-use, most reliable card available. Making backups of your total load software can be as easy as pressing the button, inserting a blank disk and hitting the return key twice. WildCard 2 copies 48K, 64K and 128K software, and, unlike other cards, is always ready to go. No preloading software into the card or special, preformatted diskettes are required. Your backups can be run with or without the card in place and can be transferred to hard disks. \$139.95 complete.

Important Notice: These products are provided for the purpose of enabling you to make archival copies only. Under the Copyright Law, you, as the owner of a computer program, are entitled to make a new copy for archival purposes only, and these products will enable you to do so.

These products are supplied for no other purpose and you are not permitted to utilize them for any use, other than that specified.

Copy II PC (IBM)

This is **THE** disk backup program for the IBM PC and PC/XT that backs up almost anything. Others may make similar claims, but in reality, nothing out performs Copy II PC . . . at any price. Copy II PC even includes a disk speed check and is another "best buy" at only \$39.95.

We are the backup professionals. Instead of diluting our efforts in creating a wide variety of programs, we specialize in offering the very best in backup products. So, protect your software investment, before things get too hot.



CENTRAL POINT Software, Inc.

The Backup Professionals

To order, call 503/244-5782, 8:00-5:30 Mon.-Fri., or send your order to: Central Point Software, 9700 SW Capitol Hwy, Suite 100, Portland, OR 97219. Prepayment is required. Please include \$3 for shipping and handling (\$8 outside U.S. or Canada).

REMEMBER.



ELEPHANT[™] NEVER FORGETS.

A full line of top-quality floppies, in virtually every 5 1/4" and 8" model, for compatibility with virtually every computer on the market. Guaranteed to meet or exceed every industry standard, certified 100% error-free and problem-free, and to maintain its quality for at least 12 million passes (or over a lifetime of heavy-duty use).

Contact Dennison Computer Supplies, Inc., 55 Providence Highway, Norwood, MA 02062 or call toll-free 1-800-343-8413.
In Massachusetts, call collect (617) 769-8150. Telex 951-624.

Dennison

Circle 289 on reader service card



World's Fastest Serial Printer

Line printer performance at half the cost

*Up to 300 lpm throughput
at 600 cps*

*Letter Quality/
Correspondence at
100/150 cps*

High Density Graphics

*Lowest cost per
character*

NCR

NCR is a Registered Service Mark

Florida Data Printers give you line printer throughput at well under line printer prices. They match line printer performance on many types of jobs. Throughput is optimized by Florida Data's patented stored energy printhead — *the world's fastest*.

The reliable automatic cut sheet feeder is an integral part of the printer — not an expensive add-on. The unique triple paper path also allows continuous forms and hand fed sheets. These printers are built to run 365 days a year. And nationwide NCR service is part of the package.

*Call (305) 259-4700 or
mail coupon for details*

Florida Data Corporation
600D John Rodes Blvd.,
Melbourne, FL 32935

Send me information on your
OSP printers.

NAME	TITLE
COMPANY	
ADDRESS	
CITY STATE ZIP	
TELEPHONE	

**FLORIDA
DATA**

Circle 67 on reader service card

CONDOR Data Management Software

Condor's
IBM PC-
compatible
**Relational Data-
base Management**

is the effective way to manage
your office automation needs,
such as personnel management,
inventory control, billing, manufacturing
systems, educational, and other office,
school or home needs.

With Condor you get the power and flexibility of a fully
relational database system complete with a "Step-by-
Step" MENU system to guide the new user. On-line
help is integrated into the Menu system. A complete
REPORT WRITER is also included, that even the new-
comers in our field recommend.

With Condor, setting up a new database of information,
is as simple as typing on a blank sheet of paper . . . typi-
cally, it takes a minute, maybe two. You are then ready to
enter your data into the database you just created, again just
like typing on a sheet of paper.

Then, you can SORT, SELECT, COMPUTE, POST, or PRINT your
information in almost any way that you desire. Plus, you can easily pass
information from Condor to your word processor's mail-merge, or pass spread-
sheet information into Condor. It's all very easy, and also very English.

Begin with Condor jr. (\$195), the advanced file manager. Upgrade later as your business and your data
grow, to Condor3 (\$650-or less the \$195 if you bought Condor jr.), the fully relational data
management system. It's the same system that hardware manufacturers like DEC, Sony, Zenith,
and Hewlett-Packard have selected to market with their personal computers. There are well
over 100,000 satisfied users. To find out how condor data management soft-
ware can make your business easy to handle, see your personal computer
dealer, or call **1-800-221-8479** (In Michigan call
0-313-769-3992 collect) for your nearest dealer. He'll prove
our point. That Condor is the data management software powerful
enough to be useful to business, yet simple enough for business to use.

IBM is the registered trademark of International Business Machines Corp.



condor

2051 South State Street Ann Arbor, MI 48104 313-769-3988

Circle 51 on reader service card

Ask to See Our Display at Your Favorite Software Store



The Vanpak PC Software Center displays over 450 IBM PC, XT and PC jr. programs. This complete shopping center of programs offers you a chance to try any Vanpak software "hands-on" the IBM PC. Or, plug in a videotape and see the original author talk about a program and how it is used.

The Vanpak library of software includes programs in business, database, education, engineering, entertainment, finance, investment, office management, statistical analysis, and word processing.

Vanpak software is completely supported by your dealer. Contact your Vanpak dealer NOW for a demonstration on any Vanpak program.

Software Strategies Vanpak Dealers

Alpha Business Computers
26 North Main
Minot, ND 58701

Amtec Computer Systems
8515 Douglas, Suite 17
Des Moines, IA 50322

The Software Shop
The Techniplex
East Rochester, NY 14445

Software City
206 South Fifth Avenue
Ann Arbor, MI 48104

Red River Computers
4325 - 13th Avenue South
Fargo, ND 58103

Modular Data Systems, Inc.
184 Jones Road
Falmouth, MA 02540

Softgraf, USA
291 S. Van Dorn
Alexandria, VA 22304

CESA of America, Inc.
1000 S. Highway 73
Kresson, NJ 08043

Video Tech Software
1377 E. Grand River Blvd.
East Lansing, MI 48823

Total Services
13258 Northline
Southgate, MI 48195

Apex Information Systems
2517 Van Ness Avenue
San Francisco, CA 94109

Hwang, Keye K.
1061 Wunderlich Drive
San Jose, CA 95129

Jade Computer Products
4901 West Rosecrans Avenue
Hawthorne, CA 90250

SoftServe, Inc.
1047 W. Foothill Blvd.
Upland, CA 91786

Idea Systems, Inc.
21016 Devonshire Street
Chatsworth, CA 91311

PC Whatever
35201 Newark Blvd., #2
Newark, CA 94560

Travel Center
1241 Howard
Burlingame, CA 94010

Hunter Research
6801 Dublin Blvd.
Dublin, CA 94568

Associated Business Computers
12210 Michigan Avenue, #D
Grand Terrace, CA 92324

McCormick Computer Systems
2943 Rolling Hills Road
Torrance, CA 90505

Computer Stop
28181 Marguerite Parkway
Mission Viejo, CA 92692

Computer Stop
3637 Thousand Oaks Blvd.
Westlake, CA 91361

Strictly Software
2334 South King
Honolulu, HI 96826

DataTracer
425 1/2 Santa Fe
Encinitas, CA 92024

Software Supermarket
11960 Wilshire Blvd.
Los Angeles, CA 90025

Personal Computer Place
1840 N. Southern
Mesa, AZ 85202

Computerlines
1134 Southwest Fifth Avenue
Portland, OR 97204

CompuSales
16819 Hawthorne Blvd.
Lawndale, CA 90260

Strictly Software
14617 1/2 Prairie Avenue
Lawndale, CA 90260

Turcotte Consultants, Inc.
2772 #1 Towngate Road
Westlake Village, CA 91361

Software Supermarket
15113 Ventura Blvd.
Sherman Oaks, CA 91403

STARTCO
3851 N. Oracle
Tucson, AZ 85705

Rocky Mountain Computing
6094 Emerald
Boise, ID 83704

Alpha Computer Systems
1609 W. Kennewick Avenue
Kennewick, WA 99336

MagnaPro
20101 - 44th Avenue W., #A-3
Lynnwood, WA 98036

Take A Byte, Inc.
813 W. Columbia Drive
Kennewick, WA 99336

Computers Plus
6595-C Roswell Road
Atlanta, GA 30328

Micro Mart
2411 South Cobb Parkway
Smyrna, GA 30083

Statewide Teaching Aids
301 C. McArthur Drive
Alexandria, LA 71306

Alpha Computer Center
1341 D George Washington Way
Richland, WA 99352

PerComp Sales
13333 Bellevue-Redmond Road
Bellevue, WA 98005

Software Atlanta
2244 Henderson Mill, #800
Atlanta, GA 30345

Computers Plus
130 Town View Plaza, #109
Gainesville, GA 30501

Business Information Systems
3145 Peachtree Road NE
Atlanta, GA 30305



7412 Washington Avenue South
Eden Prairie, Minnesota 55344

Media Conversion

Janette Martin

Converting incompatible data to the PC may seem like a monumental task. But before you give up and start rekeying data, consider the alternatives. There are a number of conversion methods to choose from, all of which are less expensive than starting from scratch.

Do you have the conversion blues? They have nothing to do with religion or condominiums. The first thing to do is to check for symptoms. You automated your office a few years ago when a single dedicated word processor cost about \$15,000. Now your lease on the equipment is up, and you plan to buy PCs and organize an inexpensive network in which users can share mass storage and printing devices. Your equipment costs will drop substantially, and your data processing flexibility will increase dramatically. The only problem is that the PC can't read the data stored on all those disks used by the old computers. The cost of rekeying your data could negate the savings of the promising new system, and you could get stuck renewing leases on equipment you really don't want.

Whether you want to update an old system or automate for the first time, there are ways to avoid rekeying data when you convert to the PC. Through one or several channels, depending on your specific needs, you can transfer data on disks, paper, and magnetic tape to disks that can be read by a PC. These channels include service bureaus, telecommunications, disk conversion devices, optical character recognition (OCR) machines, and digitizing cameras (see Figure 1).

Passing the Byte

If the volume of data you need to convert is small, you may want to simplify your life and hire someone else to do it for you. There are several service bureaus that have offered media conversion services for incompatible word processors for years. These include Altext, Racal-Telesystems, and Datascan (see "Conversion Services and Products" for a list of addresses and phone numbers).

Datascan is the only one of these companies that currently has a full range of services for converting media to the 5¼-inch, PC-DOS format used by the PC. The

You can expect to pay a service bureau 35 cents for converting a double-spaced page.

company provides a variety of media conversion services for the PC, including disk, 9-track tape, mag-card, paper-tape, and punched-card conversions. For example, Datascan can transfer data stored on IBM OS/2 8-inch disks to PC-DOS 5¼-inch disks. Datascan also provides conversion to the PC format from Displaywriter, Wang, Apple, TRS-80 Model II, Vydec, and CP/M 8-inch systems. The cost of disk conversion is based on the density and type of the source media. As a rule of thumb, you can expect to pay a service bureau 35 cents for converting a double-spaced page.

If your data is not on disk but was typed on paper with an IBM Selectric in a standard IBM font (Courier 10, Letter Gothic, OCR-B, or Prestige Elite), Datascan

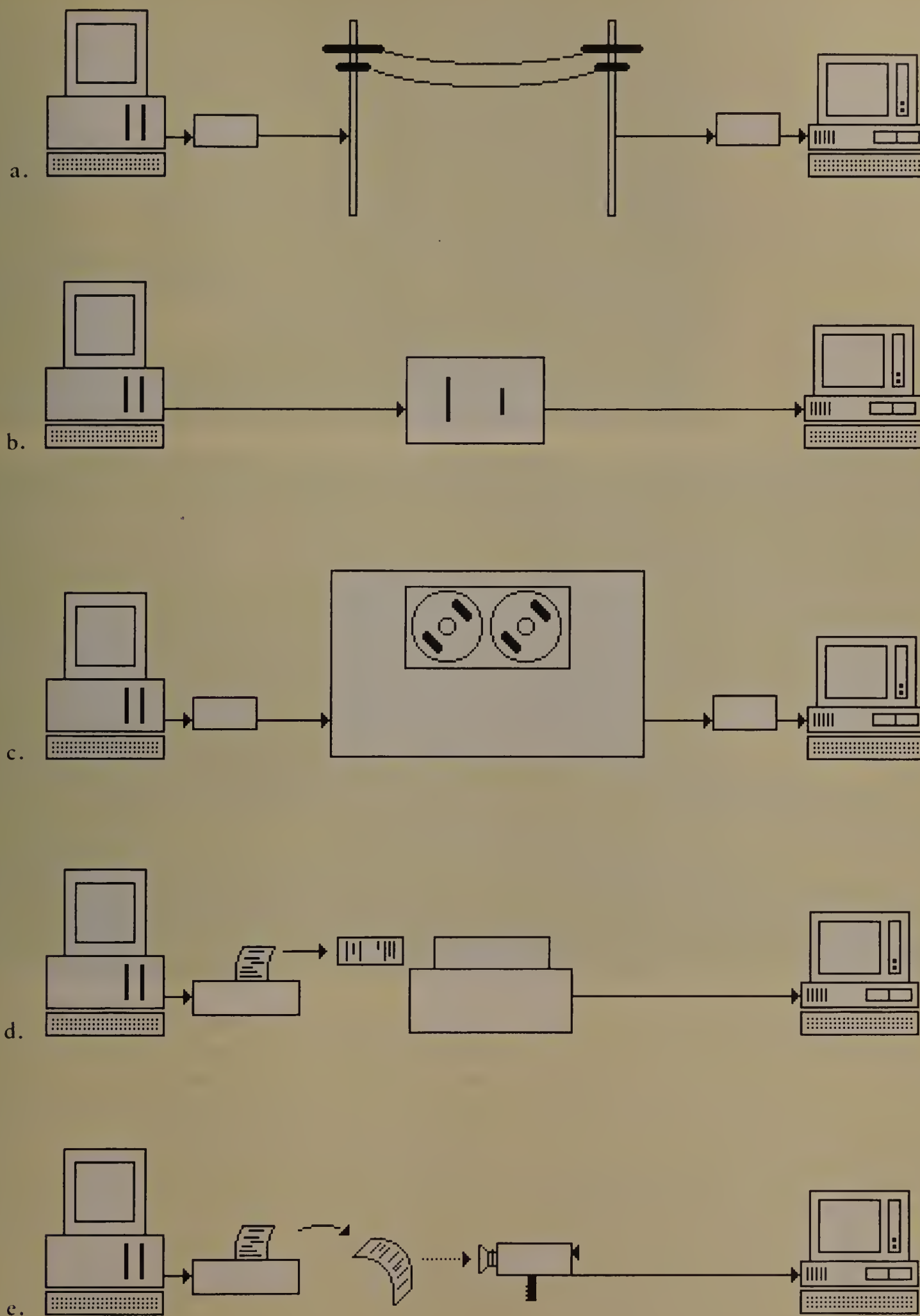


Figure 1: Five methods for converting data to the PC: (a) telecommunications, (b) mainframe conversion software, (c) disk conversion devices, (d) optical char-

acter recognition (OCR) machines, (e) digitizing camera

Hands On

can convert it to a PC-compatible disk using OCR equipment. An OCR reads typed characters and converts them to digital form. The information should be clearly typed on 8½- by 11-inch paper so the sheets can be fed into the OCR. OCR conversions to PC-compatible disks cost between 75 cents and \$1.25 per printed page.

Two other companies that handle media conversion for PC users are Pivar Computing and Golden Computer Systems. Pivar Computing specializes in converting magnetic tape and microcomputer disks to PC-DOS 1.10 and 2.00 formats. Pivar Computing also provides conversions of Displaywriter and DEC WPS 8-inch disks to the PC format. Golden Computer Systems specializes in converting software from 8-inch and 5¼-inch disk formats to the PC format.

You should also consult the Yellow Pages for local service bureaus that provide media conversion services. Service bureaus are rare because the equipment needed to convert a wide range of media can be extremely expensive.

Be sure to get complete information from the service bureau about the output results before you commit yourself. Depending on the types of media involved and the PC software you want to use with the converted data, you may need to do a little to a lot of editing on the converted files before they can be used. Most media conversion services will run a low-cost test conversion for you so you can look before you leap.

Telecommunications

If you have your old equipment and a PC at the same time, and they both have a modem and compatible telecommunications software, you can send data in standard ASCII format from the old equipment to the PC through the phone lines. You should consult telecommunications specialists from both hardware vendors to ensure that the communications programs used between the two systems are compatible with each other. I transferred hundreds of Wang WPS files to my PC using Wang's asynchronous teletype software on the Wang and *PC-Talk III* on the PC.



If your old system has already been shipped before you receive your PC, consult a service bureau or another company that has the old system with communications capabilities. The service bureau can take your old disks and telecommunicate the data to your PC.

The service bureau may charge \$30 to \$60 per hour for a telecommunications session, and you should also calculate the costs in time and personnel of handling the receiving half of the conversion. Sending a full 8-inch disk at 1200 bps could take over an hour. It may be less expensive to have the service bureau handle the entire job for you.



Clockwise from upper left: Shaffstall's Media-com 3300, Totec's TO-5000 desktop OCR, Datacopy's Model 90 Integrated Imaging System, CompuScan's Alpha Word III + Page Reader, and Dest's Model 203 desktop OCR



One problem with telecommunications conversions is that, unlike most conversions handled by service bureaus, they do not allow any code translation between media. If you send Wang files to the PC in ASCII format, codes such as tabs, indents, and underlines will be stripped. However, except for the lack of those print enhancements, the ASCII file will look the same when printed from the PC as it looked when printed from the Wang.

Code Conversion Software

If you frequently need to transfer files between dedicated word processors and the PC, you may want to buy conversion software. *Soft-Switch* from Integrated Technologies, Inc. (ITI), provides conversions with full code translation using an IBM mainframe as the translator. The

conversion software comes in modules for use with dedicated word processors, with IBM mainframe computers, and with word processing software on the PC. Specific modules support the Displaywriter, Wang, Xerox, and Lexitron dedicated word processors as well as *WordStar* and *MultiMate* on the PC. A module for IBM PROFS is also available for transferring mainframe word processing files and distributing files through mainframe terminals and PCs.

If you don't have access to an IBM mainframe, ITI will provide the name of a time-sharing company that has *Soft-Switch* on an IBM mainframe. You can then send your dedicated word processor files to the mainframe, where they can be downloaded to your PC. To use

● Hands On

this system you will still need to purchase the *Soft-Switch* modules for your dedicated word processor and PC word processing program.

ITI claims that *Soft-Switch* provides complete code translation between systems; a Wang file sent through *Soft-Switch* to a PC can be picked up in *MultiMate* and will look like it was created in *MultiMate*. Print enhancements, word wrap, and other control codes remain intact. At this writing ITI's complete transfer program is yet to be finished. The mainframe module costs \$20,000, and each word processor module costs between \$5000 and \$10,000.

For owners of IBM's Displaywriter dedicated word processor, there is yet another alternative for converting data to the PC. As part of a master plan for compatibility among IBM machines, IBM has announced a \$495 connection kit that consists of a cable and two disks. The kit allows data to be transferred back and forth between a Displaywriter and a PC. To further improve compatibility, IBM has introduced a series of *DisplayWrite* word processing programs for the PC, the PC XT, and the PCjr that imitate the commands and functions of the dedicated Displaywriter.

Disk Conversion Devices

If you need to convert a large amount of data, you may want to purchase your own conversion device. Two companies that make disk-to-disk conversion devices for the PC are Flagstaff Engineering and Shaffstall Corporation. Flagstaff makes two types of disk readers that read and write 8-inch disks and connect directly to the PC. One model has a single drive, and the second model has two drives—one read/write drive and one hard disk drive that stores up to 1.2MB of data.

Both of the Flagstaff disk readers come with two types of utility software for data transfer and code translation between 8-inch disks and the PC's disks. The File Connection utility converts source and data files from CP/M 8-inch, IBM 8-inch, TRS-80 Model II, and DEC RT 11 formats to PC-DOS and vice versa. The Word Connection utility converts word processing files from such dedicated systems as the Displaywriter, CPT, DEC WPS, NBI, and OS6 and from PC word processors such as *WordStar* and *MultiMate*. The disk readers accept single- or double-sided, single- or double-density disks with 128, 256, 512, or 1024 bytes per sector.

Flagstaff's single-drive disk reader costs \$1445, and the double-drive reader costs \$2145. Software modules supporting various media conversions cost \$395 to \$595 each.

Shaffstall makes two disk readers, the Mediacom 3300 and the Mediacom 5000. The Mediacom 3300 reads and writes 8-inch disks, and the Mediacom 5000 reads and writes both 8-inch and 5¼-inch disks. Both readers connect to the PC through the serial port. Communications software is required for file transfer.

Shaffstall offers 30 software modules to use with the readers for various media conversions. These include modules for Wang (5¼- and 8-inch), Xerox, NBI, CPT, IBM, NEC, Osborne, Lanier, TRS-80, and more. The Shaffstall readers allow code conversion, and Shaffstall supplies code conversion charts for popular software packages.

Installation, training, and one software module are included with Mediacom 3300 (priced at \$11,000) and Mediacom 5000 (priced at \$16,500). Additional modules are \$1350 each.

Optical Character Recognition

If you need to convert large volumes of typewritten material on an ongoing basis, you might consider buying an OCR machine. If your computer's disk format is not recognized by conversion devices, you may be able to print out text in a font that an OCR can recognize. OCR machines either plug into the PC's asynchronous communications board (the RS-232C serial port) or come with a special board that fits in an expansion slot. Communications software is usually required.

OCRs have improved in quality and come down in price in recent years. If you process data from a variety of incompatible sources, an OCR may be the best way to save you from retyping hard copy. OCRs enable you to input data on the PC in less time than it would take you to rekey it—and with less chance of error.

With any OCR the quality of the typewritten material affects the quality of the converted output. If a typewritten character is unevenly shaded or broken, the OCR may not be able to read the character correctly. Most OCRs flag unidentifiable characters so you can edit them on disk.

Dest, Totec, and CompuScan make compact, desktop OCRs that convert typewritten material in a variety of fonts to the PC format. Dest offers two basic OCRs, the Model 202 and the Model 203. The Model 202 reads a page in 25 seconds, and the Model 203 takes only 15 seconds to read a page. Up to 75 sheets of typewritten material can be inserted into the OCR's automatic sheet feeder. The Model 202 costs \$7000 and comes with a module for reading the Courier 10 font. Modules for identification of other fonts cost about \$500 each. Up to eight font-identification modules can be installed on one OCR. A format processor can be purchased for \$1500 to connect the OCR to the PC to achieve the best possible formatting results. Without the format processor, files may require extensive editing to eliminate carriage returns and control characters.

Conversion Services and Products

The following companies provide services, software, and hardware for converting data to the PC. Check the Yellow Pages for additional sources.

Services

Altertext
210 Lincoln St.
Boston, MA 02111
617/426-0009

Racal-Telesystems, Inc.
410 N. Michigan Ave.
Chicago, IL 60611
312/329-0700

Datascan, Inc.
2716 Ocean Park Blvd.
Santa Monica, CA 90405
213/452-9114

Pivar Computing Services, Inc.
47 W. Dundee
Wheeling, IL 60090
312/459-6010

Golden Computer Systems
2303 Lake Harbin Rd.
Morrow, GA 30260
404/961-2485

Software

Integrated Technologies, Inc.
200 N. Warner Rd. #414
King of Prussia, PA 19406
215/768-9330

IBM

Systems Products Division
P.O. Box 1328
Boca Raton, FL 33432
800/447-4700, 800/447-0890 Alaska
and Hawaii, 800/322-4400 Illinois

Disk Conversion Devices

Flagstaff Engineering
2820 W. Darleen
Flagstaff, AZ 86001
602/774-3588

Shaffstall Corporation

7901 E. 88th St.
Box 50990
Indianapolis, IN 46250
317/842-2077

OCR Devices

Dest Corporation
2380 Bering Dr.
San Jose, CA 95131
408/946-7100

Totec Co., Ltd. USA
19151 Parthenia Ave., Ste. A
Northridge, CA 91324
818/993-9413

CompuScan, Inc.
81 Two Bridges Rd.
Fairfield, NJ 07006
201/575-0500

Caere Corporation
100 Cooper Ct.
Los Gatos, CA 95030
408/395-7000

Key Tronic Corporation
P.O. Box 14687
Spokane, WA 99214
509/928-8000

Bi-Tech Enterprises
10B Carlough Rd.
Bohemia, NY 11716
516/567-8994

BancTec
800 E. Main St.
Norristown, PA 19401
215/277-0500

Imaging Systems

Datacopy Corporation
1215 Terra Bella Ave.
Mountain View, CA 94043
415/965-7900

Totec's TO-5000 desktop OCR reads up to 300 characters per second (cps) and can handle up to 30 typewritten sheets in its automatic sheet feeder. The TO-5000 retails for about \$10,000, with one font-identification module and a format interface included.

Both Dest and Totec OCRs recognize a number of popular IBM typewriter fonts including Prestige Pica, Prestige Elite, Letter Gothic, OCR-A, OCR-B, and Courier. At this time the Dest and Totec machines (like most OCRs) do not read dot matrix print.

CompuScan makes an OCR called the AlphaWord III + Page Reader that reads eight standard fonts. When used with CompuScan's *LineScan* software, the Page Reader can scan line by line, rather than character by character, to speed up conversion to 300 pages an hour. The reader, with software, costs \$30,000. CompuScan also makes a less sophisticated OCR called the AlphaWord Series 80 that retails for under \$10,000.

If you want to convert lines of OCR font, credit card sales slips, computer-generated invoices, or store price tags, you can use an OCR data entry device designed especially for converting such data to the PC. The Caere Corporation's Series 500 OCR system is a hand-

Read this if you need data security

At H-F, we've got inexpensive tools of the trade that your PC shouldn't be without. For example:

HFtools for Disk Security MS- & PC-DOS
Protect Sensitive Data • multi-faceted security strategy • user-selected key may be changed at will • locks entire diskette or hard disk • easy to use, menu-driven operation

Includes comprehensive documentation.

**So act now.
Ask your dealer today.
Or order directly from us.**

Call
1-800-268-1121
(in Canada and U.S.)



H-F Computing Services Inc.
224 Old Orchard Grove
Toronto, Ontario
Canada M5M 2E5
Dealer inquiries invited.



Circle 708 on reader service card

**The only Project Planning System that
gives you this flexibility:**

Project Title Sample Project Data

Main Menu

- 1 --> INPUT
- 2 --> EDIT
- 3 --> RANK / PROCESS
- 4 --> DISPLAYS
- 5 --> REPORTS
- 6 --> VERSION
- 0 --> TO EXIT

enter selection: ? . . .

Quick•Plan

The Executive Project Planning System

- Quick•Plan runs on MS DOS for: IBM PC, DEC RAINBOW+, WANG PC, HP 150, Data General DT
- Requires: 384K of core, graphics option- 132 wide printer

For more information call or write:



Mitchell Management Systems Inc.

FORMERLY STRUCTURAL PROGRAMMING INC.
Westborough Office Park 2000 West Park Drive Westborough Mass 01581 U.S.A
Telephone (617) 366-0800 TWX 710-347-1054

Circle 111 on reader service card

Hands On

held wand reader that attaches to an expansion board in the PC and sells for \$1145. The wand can record any text image composed of up to 80 characters. You can program the wand to read only specified formats by defining field lengths and character types.

Key Tronic makes a hand-held OCR reader that plugs into a Key Tronic keyboard attached to the PC. Bi-Tech Enterprises and BancTec also make hand-held OCR devices for the PC.

Getting the Picture

For those who need to convert photographs or drawings to disk, a digitizing camera is available from Datacopy. With the digitizing camera you can even put your dog Fido on disk, along with any other three-dimensional object. Common applications for the camera are signature verification and the capture and storage of images for integration with text. Datacopy's Model 90 Integrated Imaging System includes a camera, an interface board, and menu-driven software for the PC for \$9945.

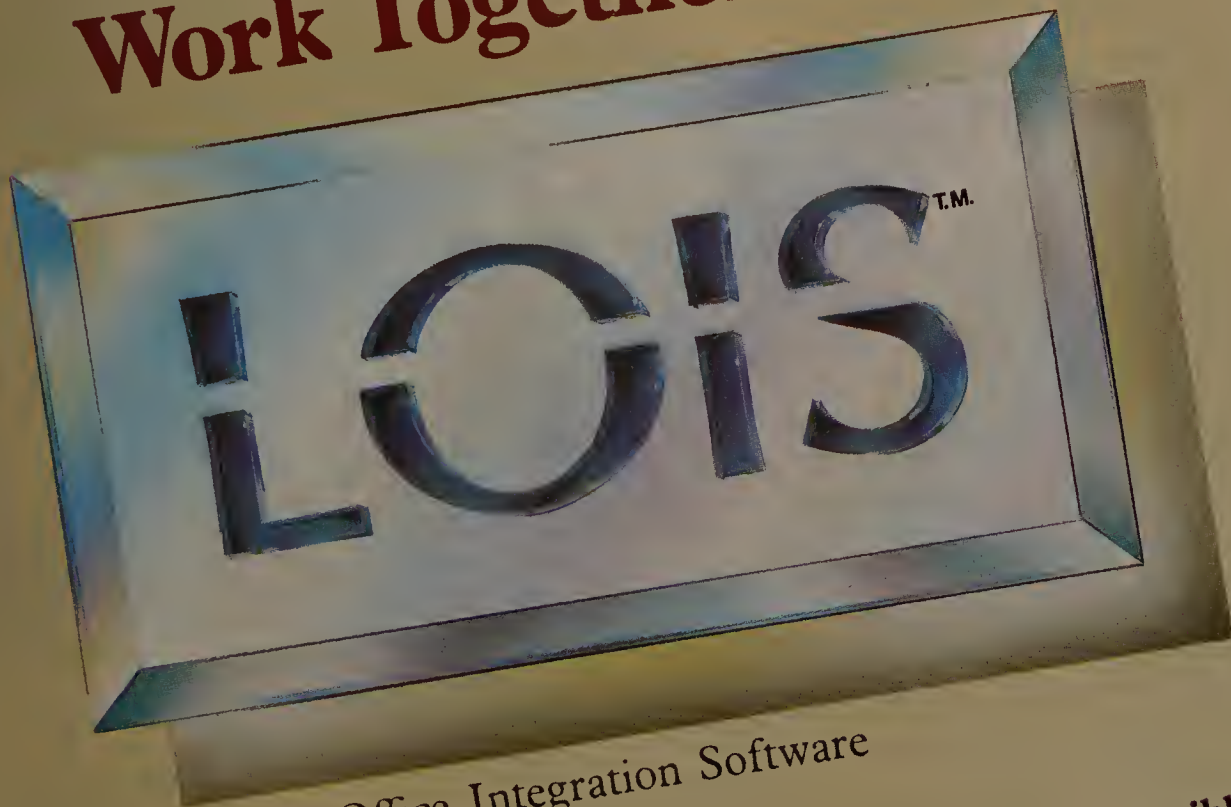
The Datacopy system uses a standard 35-millimeter camera lens that incorporates an analog-to-digital converter. The camera processes images into computer-readable digital code, breaking the optical image into 1728- by 2846-pixel resolution. Two scanning modes are available: threshold mode for converting text and line drawings and half-tone mode for converting three-dimensional objects and pictures. The half-tone mode uses gray scaling to shade and contour the converted image. The image is reduced for storage and display, but a capture window controlled from the PC can select sections of the image to zoom in on. The image can be displayed, printed on an Epson printer, or stored on disk (a hard disk is recommended).

Shaking the Blues

Conversion is never an easy process, but it needn't be painful once you find the conversion method your situation requires. Analyze your options by testing in advance and compare the cost and performance of all alternatives. Once data is on the PC, converting it from one program to another is much easier than converting between computers. With a little planning, you can say good-bye to the conversion blues forever. ●

Janette Martin is a Contributing Editor for PC World. She owns an information processing company in San Francisco that specializes in training services for the PC.

The Software **INTEGRATING** System... Totally Open-ended to Make IBM PCTM* Programs Work Together!



Lytron Office Integration Software

LOIS makes independent software packages work together to create customized Work Stations.**

It's a single open-ended software package integrating multiple independent programs such as WordStarTM, dBaseIITM and Lotus 1-2-3TM with one simple interface and one simple command structure.**

A touch of the key enables the user to transfer data from one software package to another, or to move from one program to another.

There is no "lock-in" to a particular software product line. With the LOIS Work Station the user can select any number of favorite application programs for integration. They can be selected off-the-shelf or from the user's library of custom programs.

Add-ons are easy and virtually limitless. The LOIS Work Station integrates them all.

LOIS is flexible. It allows you to sell more software because customers keep coming back. It adds value to the user's present programs. It adds functionality and productivity.

LOIS is available now!

For more information call 1-800-223-6250, or 801-264-2050

ModTech International

5250 South Green St.
Suite 100
Salt Lake City, UT 84123

LOIS is distributed worldwide exclusively to reseller channels by ModTech International

*IBM PC is a trademark of International Business Machines Corp.
**LOIS is a trademark of Lytron Systems, Inc.

***WordStar is a trademark of MicroPro, Inc.; dBaseII is a trademark of Ashton-Tate; Lotus 1-2-3 is a trademark of Lotus Development Corp.

Charlie...You're too expensive!

Now you can get an AMI-PC for just

\$1995*

List price \$2295

American Micronics, Inc., is proud to introduce its total IBM-PC® compatible personal computer, the AMI-PC®

AMI-PC runs under DOS, 1.1, 2.0, 2.1, MS DOS, CP/M86® and p-System®

- AMI-PC system comes with 16 bit 8088 based CPU • 128K RAM
- Memory upgradeable to 256K • Two 320 K DS/DD Slimline Drives
- Floppy Disk Controller • Color/Graphic Adapter • Green Monitor
- 83 Key Detachable Keyboard with CAP and NUM Lock Indicators
- Two RS-232C Serial Ports and One Parallel Port.

Option: 5, 10, or 15 MB Hard Disk upgrades available.

- SIX MONTHS LIMITED WARRANTY
- 10 DAY MONEY-BACK GUARANTEE**
- AFTER SALE TECHNICAL SUPPORT



Partial List of softwares that run on AMI-PC

Air Traffic Controller	IBM® Microsoft Adventure	PFS Report	Easy Writer
AST-378 and AST-SNA	IBM® Macro Assembler	PFS Write	General Ledger
Benchmark	Lotus 1-2-3	Supercalc	Multiplan
dBase II®	Norton Utilities	VisiCalc®	BPI Personal Acc.
IBM® Cobol Compiler	Prokey	Volkswriter	Perfect Writer
IBM® Fortran Compiler	PFS File	WordStar	Info Star

Please call or write for the dealer nearest you.



**American
Micronics, Inc.**

17842 Irvine Blvd., Suite 122, Tustin, CA 92680, (714) 731-5201, (714) 559-1598, Telex 4722121

Dealers application accepted.

AIR TRAFFIC CONTROLLER is a registered trademark of Avant-Garde; AST-378 and AST-SNA are registered trademarks of AST Research; BENCHMARK is a registered trademark of Metasoft; FRIDAY & dBASE II® are registered trademarks of Ashton-Tate, Inc.; IBM® Cobol Compiler, IBM® PC, IBM® Fortran Compiler, IBM® Microsoft Adventure, IBM® Macro Assembler, PC-DOS 1.1, PC-DOS 2.0, PC-DOS 2.1, are registered trademarks of IBM Corporation; LOTUS 1-2-3 is a registered trademark of Lotus Development; MS DOS 1.25 is a registered trademark of Micro Network Corp; NORTON UTILITIES is a registered trademark of The Norton Utilities; PROKEY is a registered trademark of Rossoft; PFS FILE, PFS REPORT, PFS WRITE are registered trademarks of Software Publishing; SUPERCALC is a registered trademark of Sorcim; VISICALC® is a registered trademark of VisiCorp; VOLKSWRITER is a registered trademark of Lifetree Software, Inc; INFO STAR, WORDSTAR are registered trademarks of MicroPro; CP/M86® is a registered trademark of Digital Research, Inc; UCSD-p is a registered trademark of SofTech Microsystems; AMI-PC is a registered trademark of American Micronics, Inc; EASY WRITER is a registered trademark of IUS; GENERAL LEDGER is a registered trademark of ASK Micro; MULTI PLAN is a registered trademark of Microsoft; BPI is a registered trademark of BPI Systems; PERFECT WRITER is a registered trademark of Perfect Software.

*Special introductory price

**Shipping and insurance charges are paid by the purchaser.

©American Micronics, Inc. 1984

Circle 764 on reader service card

We thought about calling it MacSimplex . . . after all it makes your IBM®PC behave like a Macintosh™ and much more . . .

and with over two years in the making, the Simplex Database Management System has features like 32-megabyte virtual memory and the most powerful networked/relational database in the microcomputer industry. Simplex was designed around how you think and the Macintosh way, so that you can use your favorite mouse to handle those mundane tasks like menu selection and data manipulation. And, if you don't have a mouse, you can use our keyboard mouse simulator, MouSim™.

Pop-up and pull-down menus, dialog and alert boxes are not just added features, they are the heart of the Simplex way. In addition, Simplex gives you both a software and a hardware floating point capability, each with 19-digit accuracy. It permits login, password, privilege, and can be used on a local area network. Simplex has full communications and a remote or local printer spooler. Above all, Simplex is modular and grows with you! Simplex also has a full-featured, English-like language which is simple to use.



You can't buy Simplex™, but it is now available as an integral part of
*it's my **Business**™* and will be used by *it's my **Word**™*, *it's my **Graphics**™*, . . .

Businessmen! *it's my **Business*** will revolutionize the way that you handle your business. It saves time, money, and standardizes your system for all who use it. *it's my **Business*** comes with applications like accounting, interoffice or intraoffice mail, editing, invoicing, inventory management, mail list, calendar, scheduler, forms and more. You can modify each of these to create applications specifically designed for you... maybe we should have called it "it's your Business".

Professionals! *it's my **Business*** has over 200 pages of examples and demonstrations to show you how to solve your everyday professional problems. And if these examples aren't enough, we give you a complimentary one-year subscription to Questalk™, our hands-on Simplex applications magazine.

System integrators and consultants, beware! If you are not using *it's my **Business*** with Simplex to solve your problems, don't be surprised when more novice programmers solve that complex math, industrial engineering, or business problem faster. We think that you can cut your concept-to-development time by an order of magnitude!

*it's my **Business*** (includes *it's my **Editor***) - \$695.00
*it's my **Business*** Demo Disk - \$20.00
*it's my **Editor*** - \$100.00.

Quest Research software is available through your local computer store or through mail order from Quest Software Corporation at (205) 539-8086. 303 Williams Avenue, Huntsville, AL 35801.

Value added resellers and dealers please contact Quest Research, Incorporated at (800) 558-8088. 303 Williams Avenue, Huntsville, AL, 35801.

™
Quest Research Inc.

IBM is a registered trademark of International Business Machines. Macintosh is a trademark of Apple Corporation. *it's my **Business***, *it's my **Word***, *it's my **Graphics***, *it's my **Editor***, *it's my **Home***, *it's my **Voice***, *it's my **Ear***, *it's my **Statistics***, Simplex, MouSim, Questalk, and the Quest logo are trademarks of Quest Research, Incorporated.

CONDOR jr.

Data Management Software



**Condor's
IBM™ PC-compatible file management software is
one of the easiest and most complete MENU
assisted file managers today, and for just \$195.**

Would you buy a file manager that can't add two numbers? Of course you wouldn't. PFS FILE™ contains no arithmetic capability and can't even balance a checkbook!

Condor jr. offers all the benefits of PFS FILE™ **plus** the ability to easily balance your checkbook, total your purchase orders, average grades and even monitor your tax deductible expenses. This is in addition to your normal mailing list and other file management tasks. Unlike PFS FILE™, Condor jr. also offers **report writing** at no additional cost.

Condor jr. allows you to upgrade to Condor3 and save money as your needs grow. You can move to a fully relational database without redoing your system. A \$195 discount off Condor3 also makes it easier.

Since Condor has years of data management experience — we have a proven growth path for you. Condor jr. has been especially designed for the first time user. Not surprisingly, it is designed directly from Condor 3 — a fully relational database that is being used in over 100,000 businesses today.

To find out more about Condor jr. and the demonstration-pack software, see your personal computer dealer, or call **1-800-221-8479** (in Michigan call

0-313-769-3992 collect) for the dealer nearest you.

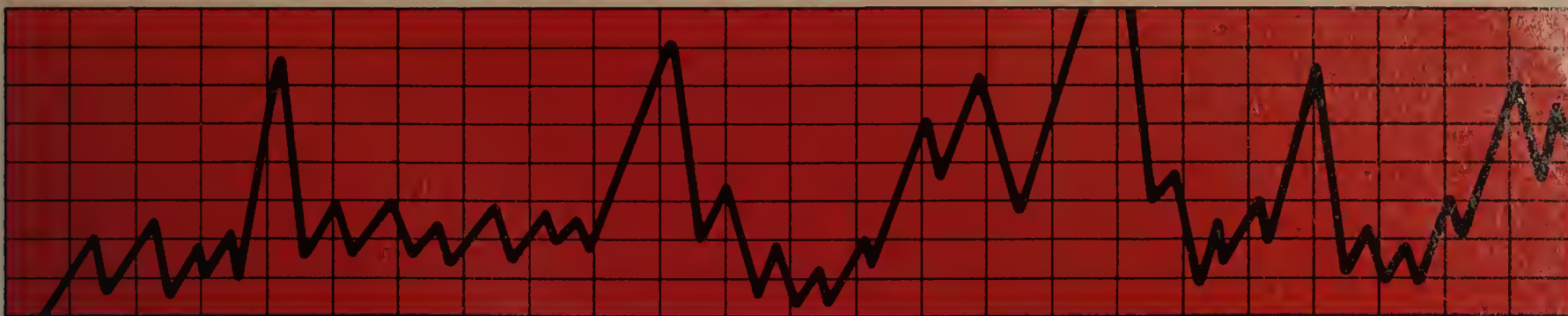
IBM is the registered trademark of International Business Machines Corp.
PFS File is the registered trademark of Software Publishing Corp.

Circle 51 on reader service card



condor

2051 South State Street Ann Arbor, MI. 48104 313-769-3988



STOP unexplained data loss, BLOCK power line hash and AVOID damaging transient voltages with GESP-753!

Now you can plug into the double-duty protection for your sensitive personal computer! General Electric's GESP-753 Voltage Surge Suppressor guards valuable equipment two ways: against voltage spike and noise—all in one device!

With a GESP-753 Voltage Surge Suppressor, you can also guard against potentially damaging transient voltages and prevent the generation of additional noise from being sent down the power line by your equipment. Reduce unexplained data loss and block interference that raises havoc with audio or TV reception.

How spikes, surges and other gremlins attack.

Power switching devices (such as heating/cooling equipment going on and off)...utility transformers stepping up power to meet peak load needs...and/or an electrical storm in the area. Each and



all of these can play havoc with any sensitive electronic equipment—and your data input in particular—by triggering a momentary surge, a transient voltage spike, radio-frequency or electromagnetic interference.

Simple installation.

Just plug the GESP-753 into the upper outlet of any standard 110v wall grounding

receptacle. A stabilizer pin fits into the grounding contact of the unused outlet to hold the unit in place. Once plugged in, a built-in light is illuminated to remind you that the protection circuits are working. Then, simply plug in the power supply cord of the equipment you want protected; up to three grounded outlets per GESP-753.

Technical Specifications

- Clamping level 325v
- Attenuation
 - Up to 40 db (200 KHz—30 Mhz)
 - Over 35 db (0.5 Mhz—5 Mhz)
- Response time 1 nanosecond
- Energy dissipation 50 joules

For the names of distributors and dealers in your area where you may obtain the GESP-753, circle the number shown below on the reader's service card.

We bring good things to life.

GENERAL  ELECTRIC

Microwave Products Department, 316 E. Ninth St., Owensboro, KY 42301

CP/M to DOS

Perfect Software's Perfect Link communications program includes a helpful utility for converting data to and from the PC.

Steven D. Ryals

Back when I bought my first Osborne computer, the IBM PC was still a gleam in a Florida design team's eyes. I happily spent hundreds of hours learning to use *WordStar* and *dBASE II*, never giving a thought to the day when I might want to graduate to a more sophisticated system. Then, after I had laboriously programmed numerous applications on the Osborne, I found myself wanting the increased power, storage, and status that only an IBM PC or compatible machine could give.

Due to my fears about transferring all my CP/M programs to MS-DOS, I put off buying a new computer for several months. Finally, a deal came along that I couldn't refuse, and I found myself the proud owner of a Compaq. I also found myself wondering how in the world I was going to move my *dBASE II* and *WordStar* files over from my Osborne.

Sure, I could transfer the files with two modems and the requisite software and cables. Or I could get communications software and a null modem cable and hard-wire the files from the Osborne to the Compaq through their RS-232C ports. But both methods involved considerable time and expense, and I would be stuck with equipment I had no im-

mediate need for. I considered using a file transfer service, but I didn't want to wait for the disks to be mailed back and forth.

I was beginning to ask myself whether it might not be easier to re-type all of the programs and data files into the Compaq. But since I intended to continue to use the Osborne for business applications, I wanted a way to transfer files in both directions. With all these considerations, I wound up with the Osborne sitting on the floor while I became better acquainted with my Compaq. One sunny day I received a flyer from a mail-order software firm offering a special price on a program from Perfect Software called *Perfect Link*.

This new member of an integrated line of software called *The Perfect Library* is promoted as a communications package designed primarily to access services like The Source and CompuServe. Since I was not ready to buy a modem, communications didn't interest me. However, what did pique my interest was the claim that *Perfect Link* could read and write between disks formatted on over 20 different CP/M and MS-DOS computers, all without modems or cables. I ordered a copy immediately.

When it arrived a few days later, I dropped everything and opened the package. It consisted of two disks and a well-organized, indexed manual more than 300 pages in length.

Because the wireless file transfer portion of *Perfect Link* seems almost an afterthought, I had to do a bit of searching before I found the instructions I wanted, buried in chapter 16. The information was presented in a clear, logical format.

Perfect Link lets you specify multiple file transfers with the DOS wild-card format.

The Conversion

The first thing to do after starting up the program is press the <Home> key, which brings up the main menu. Pressing <F9>, either from the opening screen or from the main menu, brings up the utility menu. Pressing <F6> from the utility menu brings up the Disk Transfer menu (see Figure 1).

The current, or default, settings are displayed on the right side of the Disk Transfer menu. To change the CP/M format, I pressed the <F3> key and was rewarded with the Disk Format menu (see Figure 2). Pressing <F6> from this menu changed the



Figure 1: Perfect Link's Disk Transfer menu provides a variety of functions for converting data from CP/M to DOS and vice versa. The default mode is listed on the right.



Figure 2: Perfect Link's Disk Format menu opens up as a window over the Disk Transfer menu. The Disk Format menu allows you to choose the specific disk formats used by the originating computer.

● Hands On

CP/M format to Osborne double density. Pressing the <End> key backed me into the Disk Transfer menu, and from there all I had to do was press the <F7> key to copy data from CP/M to DOS.

I inserted the target disk formatted for MS-DOS into drive A: and the CP/M disk containing my Osborne files into drive B: and pressed <Enter>. I then typed in the name of the file to transfer and pressed <Enter>. The file was transferred quickly and accurately.

If there is any question as to what files to transfer, the disk transfer menu lets you look at the directory of the CP/M (source) disk by pressing the <F5> key. Once the transfer is completed, you can look at the directory of the DOS-formatted disk with the <F6> key to make sure the file you wanted was transferred. *Perfect Link* also lets you specify multiple file transfers with the DOS wild-card format.

I set up and transferred a full disk of CP/M files to an MS-DOS disk in less than 5 minutes. The entire operation of this wireless file transfer was accomplished by pressing function keys—a feature certain to be appreciated, especially by nontechnical users.

Once all of my files were transferred, the only thing I had left to do before running my *dBASE II* command programs was to change the file extension from the one that the CP/M version of *dBASE II* looks for (.CMD) to the one that the MS-DOS version recognizes (.PRG). I used the DOS RENAME command to take care of this chore. I was then able to run all of the programs I had worked so hard to create. Of course, MS-DOS will not run CP/M system programs or other machine-specific programs, and CP/M won't have anything to do with MS-DOS programs, but all the programs I had converted to ASCII data files made it across in

fine shape. If I had known about *Perfect Link* all along, I wouldn't have been so traumatized and paralyzed by the dread of conversion. ●

Steven D. Ryals is a dBASE II consultant and writer living in Oakland, California. He specializes in developing business applications for microcomputers.

Perfect Link

Perfect Software, Inc.

1001 Camelia St.

Berkeley, CA 94710

415/527-2626

List price: \$149

Requirements: 128K, two disk drives

EXTEND THE CAPABILITY OF YOUR PC

RTCS ADVANCED OPERATING SYSTEMS AND SOFTWARE DEVELOPMENT TOOLS CAN TAKE YOUR PC TO THE LIMITS OF YOUR IMAGINATION

RTCS/UDI- UNIVERSAL DEVELOPMENT INTERFACE

- Runs Intel Series III software on a PC, XT or any MS-DOS computer.
 - PC/ Series III file transfer software included.
 - 100% software compatible with Series III.
 - PCSBC - Upload, download & debug target system (Option).
 - UDEBUG - Onboard debugging tool (Option).
 - Over 800 licensed RTCS/UDI's in use.
- PRICE \$500

PC/IRMX - REAL-TIME MULTIUSER MULTITASKING OPERATING SYSTEM FOR IBM PC

- More versatile than Intel's System 86/330.
 - Intel Utilities, Edit, Link, Locate, Librarian & ASM included.
 - Intel Pascal 86, Fortran 86, PL/M 86 and C 86 Languages optional.
 - Ethernet, GPIB and Hard Disk options.
 - Available for COMPAQ, TI Professional and DEC Rainbow
- PRICE \$2,250

FORCON - BRING DOWN MAIN FRAME FORTRAN PROGRAMS TO RUN ON THE PC

- Pascal, PL/M, Fortran 77/66 and C compatible compilers.
 - Superior object code optimization and in-line 8087 code.
 - Support large arrays (over 64K).
 - Overlay loading.
 - Object modules run on IBM PC and XT.
 - Special large program utilities option.
 - Available for COMPAQ, TI Professional and DEC Rainbow.
- PRICE \$4,850

SOFT SCOPE - HIGH LEVEL SOFTWARE DEBUGGER

- Source code interface.
 - High level Trace, Single Step and Breakpoints.
 - Access to Symbols and Line Numbers.
 - Machine disassembly and Floating Point support.
 - Goes beyond Intel's Pscope.
- PRICE \$995

All RTCS Software products support the 8087 Numeric Data Processor.
Soft-Scope is a trademark of Concurrent Sciences, Inc.
MS-DOS is a trademark of Microsoft Corp.
iRMX is a trademark of Intel Corporation

RTCS

Distributed in Japan by SYSCON CORP., Tokyo

REAL-TIME COMPUTER SCIENCE CORP.

SOFTWARE DEVELOPMENT TOOLS
ADVANCED OPERATING SYSTEMS

P.O. BOX 3000-886, CAMARILLO, CALIFORNIA 93011 • PHONE NO. (805) 482-0333 • TELEX 467897

Circle 163 on reader service card



PALANTIR™ WORD PROCESSING

WE DON'T HAVE TO BEEF UP OUR GUARANTEE WITH A LOT OF BULL

Other software companies give you disclaimers. Palantir gives you a real guarantee: Palantir backs its software with 90 days of free phone support via a toll-free number. When you call, we won't tell you to ask your dealer or read your manual; we'll answer your question, free of charge. If we can't solve your problem, we'll replace your Palantir Software with any competitive software of comparable value.

We couldn't make an offer like this if we weren't confident about Palantir word processing. It's easy to learn, easy to use, easy to live with.

Palantir word-processing software is designed for microcomputers. Yet it gives you all the features of a dedicated word processor. You won't find a better system on the market today.

To find out more about Palantir software, mark the reader-service card

in this issue or call, toll-free: 1-800-368-3797. In Texas, call 713-520-8221.

We'll respond with detailed information on Palantir software and a free "No Bull" button. A closer look will convince you that we're not just one of the herd. And that's no *bull*.



Palantir Software 3400 Montrose Blvd. Suite 718 Houston, Texas 77006

™ Palantir is a trademark of Palantir, Inc.

245

Circle 399 on reader service card

Everything from A-Z

HARDWARE

ALLOY

Cartridge back-up system for XT.
16.5 meg on a single cart. . . **1795.00**
Interface card for XT included

AST RESEARCH

AST 6-PACK PLUS multi-function board for IBM-PC 64K-384K expandable memory, clock calendar, 1 serial and 1 parallel port, includes Super Drive and Super Spool software (optional game port adapter is available).
6-Pack Plus 64K **269.00**
For game port option add **34.95**

64K RAM set to upgrade memory by 64K **59.00**
(9 to a 64K set) *10.00 installation fee w/purchase of memory board at time of board purchase only.

MICROSOFT

New! Mouse with software . . **129.95**

QUADRAM QUADBOARD

Quadboard is exp. from 64K-256K. 1 serial port, clock calendar and quadmaster software included.
64K Quadboard **259.50**
256K Quadboard (memory installed) **399.00**

New Expanded Quadboard, expandable from 64K-384K, 1 parallel 1 serial and game port i/o bracket and quadmaster software
64K expanded quadboard . . . **264.95**
384K expanded quadboard (mem. installed) **569.00**
Quadcolor-1 color card **189.95**
Quadlink-allows running of Apple II software on IBM-PC **439.00**

MOUSE SYSTEMS

Mouse with pop-up menus (requires RS-232 port) Design your own menus for most programs software included **197.50**

PRINTER BUFFERS

Practical Peripherals-External print buffer connects between your computer and printer (cable required from computer to buffer)
32K in-line parallel with copy feature **199.00**
64K in-line parallel with copy feature **244.95**

STB

RIO PLUS Multi function board 64K-384K exp. memory. 1 serial 1 parallel and game port (game port cable included) clock calendar and PC Accelerator software.
Rio Plus 64K **254.95**

Quadram Microfrazier parallel print buffer with copy feature
MP-16 16K (upgradeable) . . . **139.00**
MP-64 64K (upgradeable) . . . **195.00**
MP-256 256K (upgradeable) . . **595.00**

TALLGRASS

Hard drive sub system with cartridge backup
TG-3012 12 mg. w/backup . . **2995.00**
TG-3020 20 mg. w/backup . . **3395.00**
Interface for PC included
DC-600 Data cartridge **34.95**

CURTIS

PC-I Pedestal for IBM monochrome display **54.95**
AD-1 Adapter for use of PC-I with Princeton Quadrome color monitor **7.95**
UNI/1 Universal tilt and swivel base for use with monitor **36.95**
EC-I 3' monochrome extension cable **36.95**
EC-II 3'-9' coiled keyboard extension cable **27.95**

DISPLAY BOARDS

HERCULES Graphics Board (Monochrome) **339.00**
PLANTRONICS Color Plus . . **369.95**
PARADISE Multi Display Card (Color & Monochrome) **384.95**
STB GRAPHIX Plus (Color & Monochrome) **284.95**

MODEMS

ANCHOR AUTOMATION MODEM

Signalman Mark XII (RS-232C) 1200 Baud modem **269.00**

HAYES

Smartmodem 300 **199.00**
Smartmodem 1200 **495.00**
Smartmodem 1200B with Smartcom II **399.00**

NOVATION

Access 1-2-3 Internal 1200 Baud Modem with Crosstalk **399.00**
Smart Cat 103/212 External 300-1200 Baud **389.95**
Modem Cable RS-232 **24.00**

VEN-TEL MODEMS

PC Half Modem-Internal 300/1200 modem fits in short slot of XT or portable PC crosstalk incl. . . **449.00**
PC Modem-1200 Internal full size modem 300/1200 Baud with crosstalk **399.95**
1200 Plus-External 300/1200 modem **399.00**
(Requires RS-232 Card and Cable)

MONITORS

AMDEK

300G-12" Green **139.95**
300A-12" Amber **154.95**
310A-(to use with IBM Monocard) Amber **169.95**
Color II Plus-12" Hi-res RGB Color Call

PRINCETON

HX-12 Hi-res RGB Color . . . **469.95**
MAX-12 Monochrome (to use with Monochrome Card) Amber . **179.00**

TAXAN

420-12"-super hi-res RGB color **449.00**
122-12"- Amber for PC (requires monochrome card) . **159.00**
121-12"-green for PC (requires monochrome card) . **169.95**

PRINTERS

OKIDATA

OKI-92 with Plug N' Play Call
OKI-93 with Plug N' Play Call
OKI-84 with Plug N' Play Call
OKI-82 **324.00**

PANASONIC

KXP-1090 80 CPS F/T **299.00**
KXP-1091 120 CPS F/T Call

EPSON

RX-80, RX-80 F/T Call
FX-80, FX-100, MX-100 Call

QUADRAM

Quadjet Color Ink Jet Printer **599.95**
ACC Kit for PC Incl. (cable req.)
Parallel Printer Cable for PC . **26.95**

DIABLO

630 API **1699.00**
Tractor Feed **269.00**
Parallel Cable for API to PC . **45.00**

NEC

3550 letter quality 33 CPS. . **1625.00**
2050 letter quality, 18 CPS . **894.95**
Tractor Feed 3550/2050 . . . **209.95**

JUKI

6100 18 CPS Call

SILVER REED

EXP-550 (16 CPS Wide Carr.) **519.95**
EXP-770 (30 CPS Wide Carr.) **879.00**
Tractor Feed for EXP-550 . . **124.95**

BROTHER

HR-15 13 CPS **439.00**
HR-25 23 CPS (Wide Carr.) . **729.00**
Tractor Feed f/HR-15 or HR-25 **124.95**
Single Sheet Feeder for HR-15 or HR-25 **224.95**

A-B PARALLEL PRINTER SWITCH BOX

Cables to Printers Included
(Reg. Cable from Computer to A-B Box not included)
\$134⁹⁵

★ This month's specials

★ VISICORP

Req. XT 512K

VISION Graph . **\$149⁹⁵**
VISION Word . **\$224⁹⁵**
VISION Calc . **\$236⁹⁵**
VISION Mouse **\$162⁵⁰**
Application Manager . . **\$57⁵⁰**
Required to run VISION

★ INFOSTAR PLUS

Version 1.6

\$249⁹⁵

Includes Star Burst

Call or Write us

FLOPPY DISKS

(Packed 10 per box) SS/DD DS/DD
IBM 5 1/4" **34.95**
MAXELL 5 1/4" **23.95** **33.95**
FUJI 5 1/4" **23.95** **33.95**
TDK 5 1/4" **23.95** **34.95**
NASHUA 5 1/4" **17.95** **24.95**

SOFTWARE

ASHTON TATE

Dbase II **369.95**

ATI TRAINING

Training for Lotus 1-2-3 **49.00**
Training for Wordstar **49.00**
Training for Dbase II **49.00**
Training for Multiplan **49.00**
How to use your IBM-PC or XT **49.00**
How to use your COMPAQ . . **49.00**

BEST PROGRAMS

PC/Tax Cut **149.95**
PC/Personal Finance Prog. II **149.95**

BPS

BPS-Business Graphics (requires color card) **179.95**

BUSINESS SOLUTIONS

JACK-2 Integrated Software . **289.95**

CDEX

Training for Wordstar **44.95**
Managing Your Business with Lotus 1-2-3 **44.95**
Training for Dbase II **44.95**

CONCENTRIC DATA SYSTEMS

C.I.P. Concentric Information Processor **249.00**

CONTEXT

MBA (requires 256K) **429.00**

DOW JONES

Connector **39.95**
Market analyzer (requires color card) **259.00**
Market manager **219.00**
Market microscope **499.00**
Spread sheet link **179.95**
Investment Evaluator **109.95**

DAYFLO

Dayflo (XT/256K) **299.95**

DIGITAL RESEARCH

Concurrent CP/M w/windows **100.00**
CP/M 86 **36.00**
DR LOGO (req. color card) . . **64.95**
C-Compiler (PC DOS) **219.00**
For other DR products CALL

FUNK SOFTWARE

Sideways **45.00**

FOX & GELLER

Quick Code (MS DOS) **149.00**
Dutil (MS DOS) **54.95**
OZ (256K) (req. color card) . . **269.95**
dGraph (requires color card) . **159.95**

HARVARD SOFTWARE

Harvard project manager . . **259.00**

HARVARD ASSOC

PC Logo (req. 128K/color card) **99.95**

HERITAGE SOFTWARE

Smartkey II **49.95**

HOWARD SOFTWARE

Tax Preparer 1984 **179.95**

HUMAN EDGE

The Management Edge (128K) **165.00**
The Sales Edge (128K) **165.00**

IUS

Accounts Receivable **289.95**
Accounts Payable **289.95**
General Ledger **289.95**
Order Entry **289.95**
Payroll **349.95**
Easywriter II System **189.95**

KNOWARE

Knoware (requires color card) **64.50**

LIFE TREE

Volkswriter Deluxe **164.95**

LIVING VIDEOTEXT

Think Tank (requires 256K) . . **134.00**

MICRO DATA BASE SYSTEMS

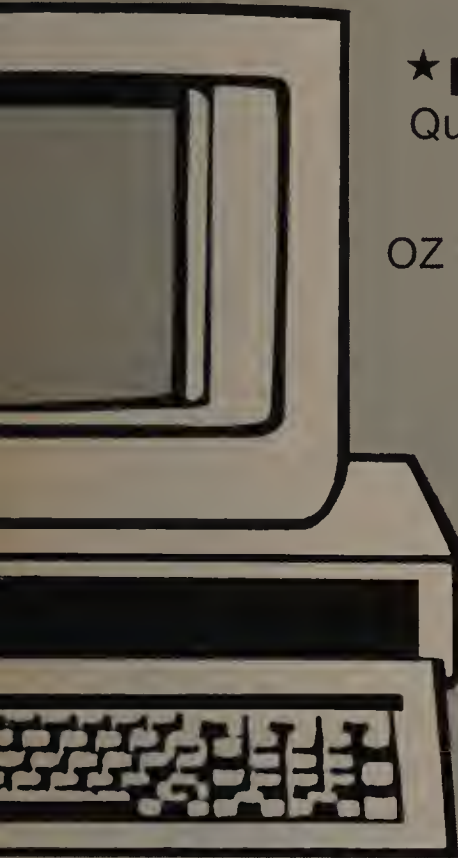
Knowledge Man **299.95**

MICRO PRO

Wordstar Professional includes Wordstar, Mailmerge, Correctstar, Star Index and Training Disk **359.95**
Wordstar 3.3 **259.95**
Infostar **239.95**

for PC as EZ as ABC.

from 47th St. Computer



★FOX & GELLER

Quick Code with DUtil

\$179⁹⁵

OZ Management Control

\$219⁹⁵

★ASHTON TATE

Dbase II

Version 2.4
with Tutorial

\$329⁹⁵

LIMITED SUPPLY

for other specials!

- No surcharge for credit cards. 
- Prompt and efficient service.  
- Extensive inventory of PC products.
- Knowledgeable and experienced sales staff.

We stock an extensive inventory on IBM PC[®], XT[®], Apple[®], Franklin[®], Kaypro[®], Compaq[®], Hyperion[®], Columbia[®], Olivetti[®], Eagle[®], etc.

MICRORIM
Rbase 4000 (requires 256K) .319.95
Extended Reportwriter 96.50
Clout 139.00

MICROSOFT
Multiplan 129.95
Macro Assembler 69.50
C. Compiler 329.00
Word w/Mouse - Version 1.1 .289.95
Word - New Version 239.95
Fortan Compiler 224.95
MS PASCAL Compiler 194.95

MICROSTUF
Crosstalk XVI 99.00

MONOGRAM
Dollars & Sen\$e 104.00

OPEN SYSTEMS ACCOUNTING
256K req.
General ledger 439.00
Accounts receivable 439.00
Accounts payable 439.00
Payroll 439.00
Inventory 439.00
Sales order processing 439.00
BI-286-D required to run 149.95

SAVE!!! Order 3 or more
Open System accounting modules
at once and deduct \$10.00
per module (BI-286-D not included)

OSPREY ACCOUNTING SOFTWARE
General ledger 219.00
Accounts receivable 219.00
Accounts payable 219.00
Inventory 219.00
Sales invoicing 219.00

PBL CORP
Letterform 1000 DOS 1.1 64.00
Letterform 1000 DOS 2.0 64.00
Personal Investor 124.00

PC SOFTWARE
PC Crayon 29.95
Executive Picture Show 124.95

PETER NORTON
Norton Utilities 49.95

PROFFESIONAL SOFTWARE
Word Plus PC with BOSS . . .309.95

ROSE SOFT
Prokey 3.0 84.00

SOFTSTYLE
SET-FX (for Epson printers) . .49.95

SOFTWARE PRODUCTS
Open Access (requires
256K/color card) 379.95

SOFTWARE SYSTEM
New Version! Multimate . . .269.95

SOFTWARE PUBLISHING
PFS File 89.95
PFS Report 79.95
PFS Graph 89.95
PFS Write 89.95

SOFTWARE ARTS
TK Solver 259.00
Financial Management 70.00
Mech. Engineering 70.00

SSI
Word Perfect with Speller . . .269.95

SORCIM
Supercalc³ 229.00

SUMMA SOFTWARE CORP
Traders data manager 139.95
Traders forecaster 179.00
Traders accountant 254.00

**Complete system includes
above 3 495.00**
(A modem and Dow Jones
Password required)

VISICORP
VisiCalc 4 179.00
VisiWord Plus 239.00
VisiFile 179.95
Visi Trend/Plot (requires color
card) 179.00

VM COMPUTING
Relay communication software 99.00

Remember Our Name — It's all the Memory You Need.

47st. Computer

Computers and Business Equipment[®]

A Division of **47st. Photo Inc.**

**67 W. 47th St. • 115 W. 45th St.
New York, N.Y. 10036**

Mail Order Address:

36 E. 19th St., N. Y., N.Y. 10003

212-260-4410

TOLL-FREE 800-221-7774
OUT-OF-STATE

STORE HOURS:
Sunday 10-4, Monday-Thursday 9-6, Friday 9-2

We accept MC, Visa, AX, M. O. Immediate shipment for personal checks cleared by our check approval service. Defective software will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within the time warranty packed with product. Items returned must be sent to 32 E. 19 St., N. Y., N.Y. 10003, Att: Returns Dept. Min. shipping and handling fee \$5.50. Prices herein are for mail and phone orders only and subject to change without notice. Store prices may differ. Some items are subject to availability.

For the latest items on the market and up-to-date sale prices check our weekly ads in the National editions of the N.Y. Times and WSJ.

IBM[®] is a registered trademark of International Business Machines Inc.

Professional Presentations

Don't let presentation stage fright get you down. Here are some simple guidelines to ensure a successful presentation.

Bill Crider

Most of the new crop of business graphics packages for the PC are fairly easy to learn and to use. A busy executive with no graphics experience can usually break open a graphics package and throw together some bar charts or line graphs in a matter of hours. Yet high-quality software and hardware do not necessarily ensure a successful presentation. You may have the most sophisticated printer, plotter, slide generator, and graphics software available and still ruin a presentation with a poorly designed slide or an overused printer ribbon.

Computer graphics can be used as a creative tool for artistic expression and experimentation, but for most business presentations, you should avoid the temptation to include every graphics feature available. In those situations it is more important to communicate than to impress. Following the practical and aesthetic

guidelines in this article will help ensure a successful presentation. At the very least it will ensure that your graphic aids don't detract from the message you want to communicate.

Keep It Simple

Whatever message you are presenting, give thought to the order of your material. Don't organize chronologically; instead, start with what your audience knows and move to what they do not know. Begin with a simple concept and move to a complex one. If you start with material your listeners accept, they will more easily credit controversial statements.

Put yourself in the place of the audience. What would you want to hear? What would you be expecting? Consider how you would react to each of your points. Do you want your audience to be relaxed or defensive? Amused or impressed? Remember, people are more often convinced by how they feel than by what they hear.

It is crucial that you keep your material succinct. If you have more than three main points, you will probably

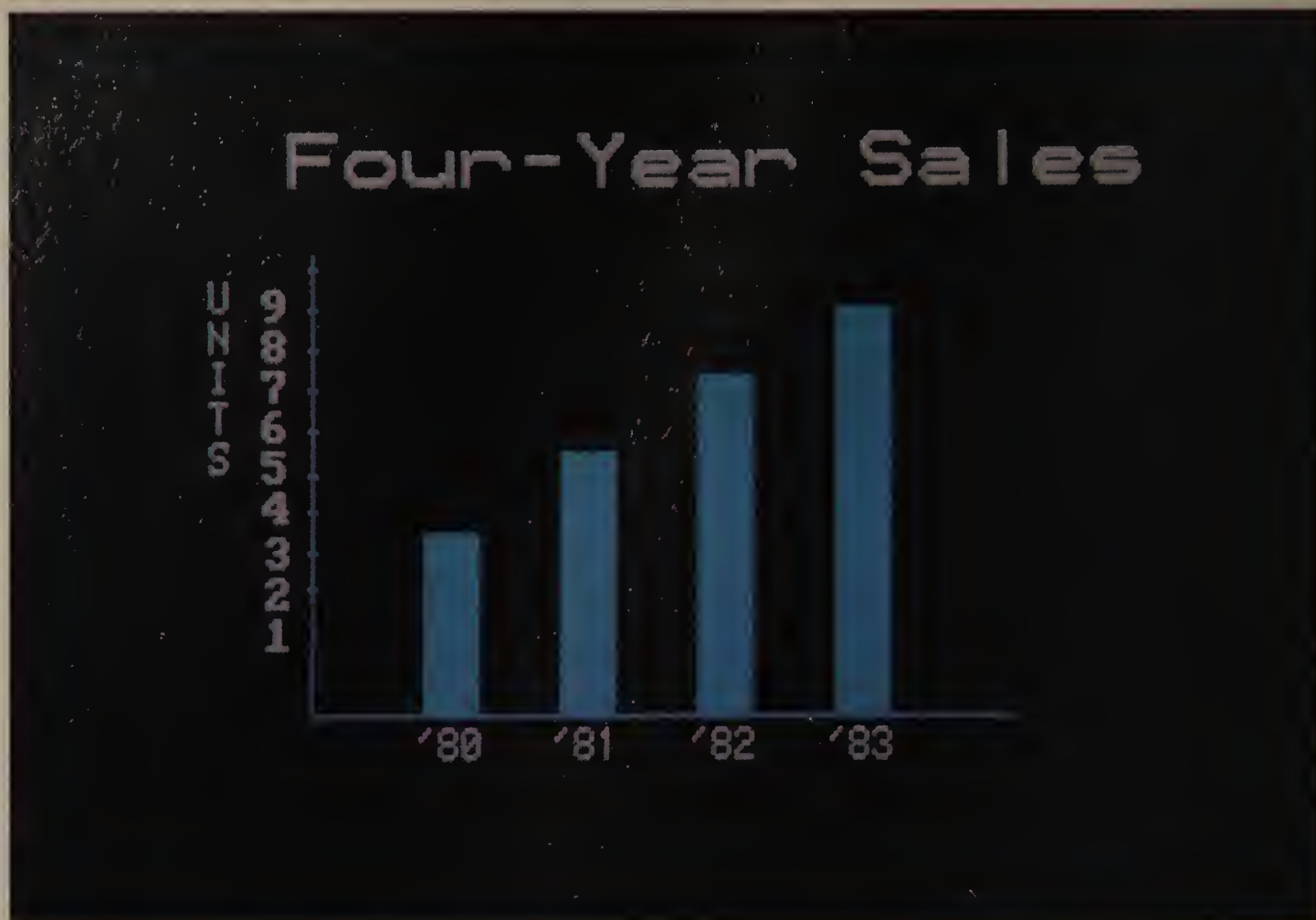
lose your audience. If you cannot state the point of the presentation in one sentence, you need to rethink your goals. One good technique for crystallizing the content is to write the last paragraph first and work backward.

A presentation without graphics is like a room without windows—dull. Appropriate graphics can set the mood, illustrate points, and make the presentation memorable. However, inappropriate graphics can easily ruin a presentation. Graphics should direct attention to the idea you are presenting, not distract from it. Icons and logos are usually appropriate. Flashing borders and purple stick figures are not.



● Hands On

Figure 1: Sample bar chart created with ExecuVision. Design the screen in thirds. The top (or left) third should contain the title. The bottom (or right) two-thirds are for art and smaller type.



The PC Slide Show

The graphics capabilities of the PC enable you to create a new form of visual aid—the on-screen “slide” show. You may have seen these in computer stores as ads and tutorials for software. The slide show consists of a series of screens that are called up by the computer in sequence. Screens can be timed to change automatically or can be controlled from the keyboard.

Timed slide shows, such as those created by *PC Projector* and *4-Point Graphics*, proceed after showing each screen of information for a specified time. If you use a timed presentation, be sure to choose an appropriate amount of time for each slide. Have someone read each slide while you time them. Multiply the minimum time by 1.5 and use the resulting figure.

As an alternative to timed presentations, some packages, such as *Pyxel Visuals* and *Energraphics*, allow you to advance the screens at the press of a key. *ExecuVision* allows you to move both forward and backward through the displays by pressing the cursor control keys. The *Executive*

Avoid the temptation to put too much on a screen.

Picture Show goes even further by branching the presentation in response to viewer interaction such as a yes or no answer or a menu selection. Basing the flow of your presentation on user interaction allows you more flexibility in coordinating your talk with your visuals. Branching lets you give several versions of a slide show using the same materials.

If you are going to give a presentation to more than five or six people, you should consider making photographic slides of the screen rather than crowding everyone around a monitor. If you are a photographer, you may want to do this with standard camera equipment. (See “Screen Shots,” *PCW*, Vol. 1, No. 5, for some hints on camera technique.) If you want to simplify matters, you can buy a slide generator that attaches to your PC (see “60-Second Slides” in this issue).

Designing a Screen

Avoid the temptation to put too much on a screen. Each screen should convey only one concept. The most effective method of designing a screen is to think of the screen as being divided into thirds. The top (or left) third should contain a title composed of letters about 1 inch tall with

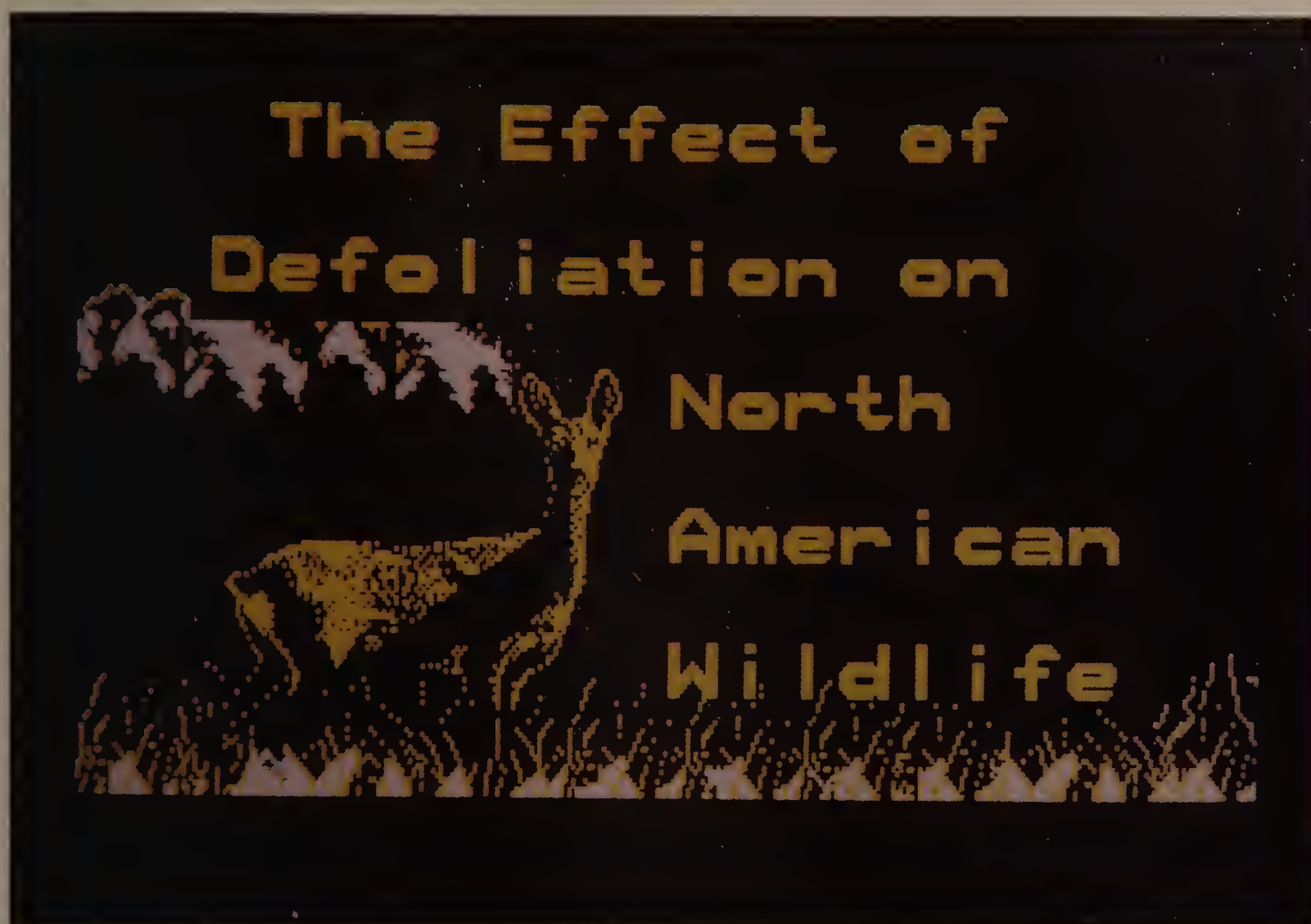


Figure 2: Picture created with ExecuVision. Letting the picture continue off the edge of the page gives the illusion that the picture is larger.

enough empty space around it to make it stand out. The bottom (or right) two-thirds are for art or smaller type. If the art consists of charts or graphs, they should be surrounded by a 1/4-inch margin (see Figure 1). If the art consists of pictures, let them continue off the edge of the screen. This creates the impression that the pictures are larger than they really are (see Figure 2).

Use only one color for the type unless you want a single word to stand out. If the graphics software allows several type styles, use one that is easy to read. Displaying letters in script, italic, or Old English fonts may seem like a good idea, but if people have trouble reading them, you destroy the impact of the message.

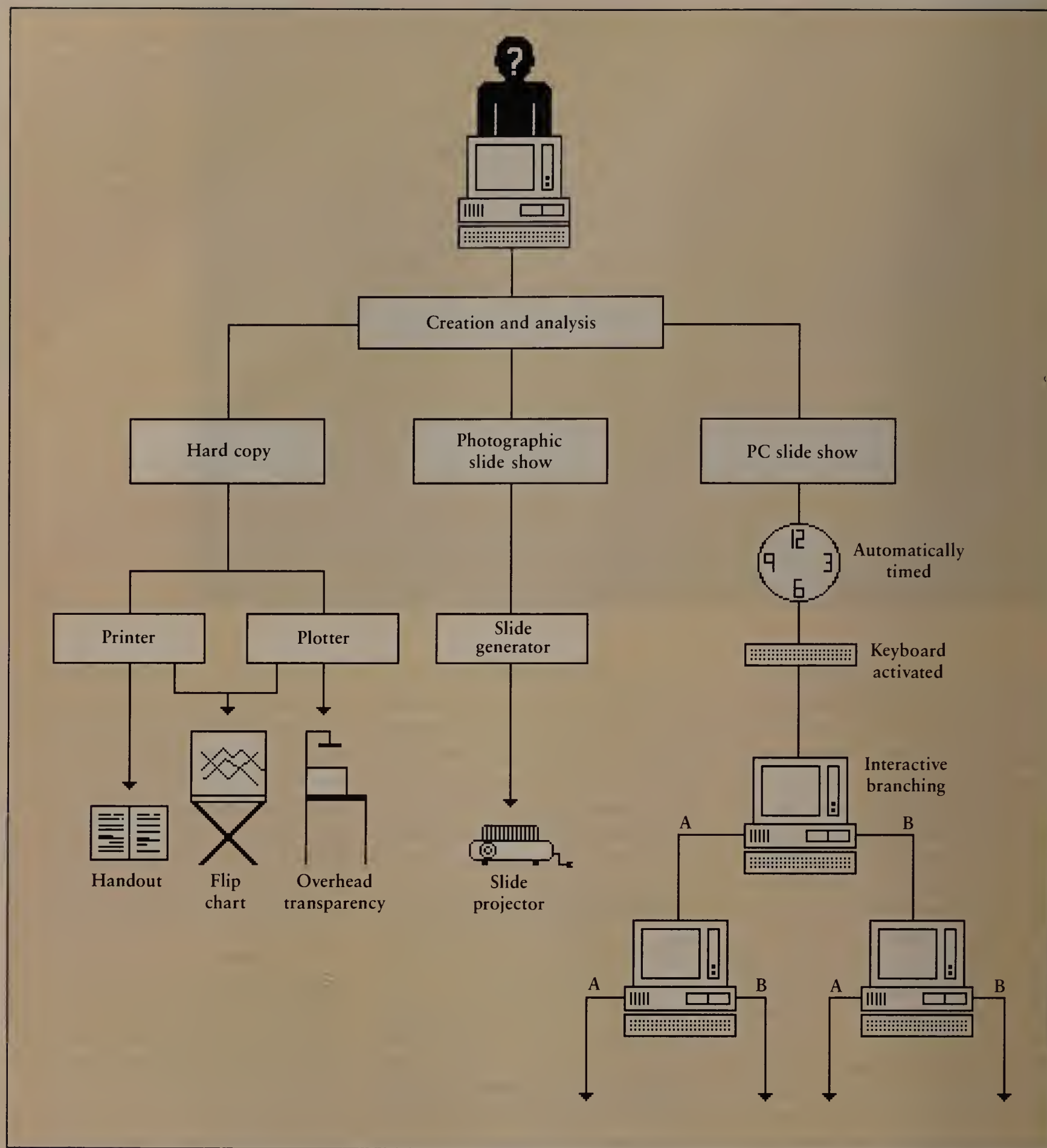
It is usually most effective to use one overall color for a screen and to trim it with other colors. Be aware of the effect of color on the viewer: subdued colors create a mood of trust; bright colors cause a mood of surprise (and hence, caution); and using too many colors creates confusion. Don't go from a screen with a dark background color to one with a bright background color. The effect is disconcerting and detracts from the content of the screen.

Some graphics programs (notably *Energraphics*, *4-Point Graphics*, and *Executive Picture Show*) allow you to integrate motion into your presentation—an effective technique if it is not overused. The on-screen demonstration that accompanies *ExecuVision* shows both bad and good uses of motion. On a screen relating to computers in laboratories, an animated mouse runs across the floor. This has nothing to do with the topic

and only distracts the audience. The same demonstration shows some excellent uses of motion: distribution centers “growing” like flowers, and bars representing sales rising before your eyes. The *Executive Picture Show* has a unique type of motion called a “scenario,” which enables you to show the steps involved in creating the screen as part of the presentation.

Font Programs

Although computer slide shows are growing in popularity, the most common medium for graphics presentations is hard copy. Hard copy is usually created on a printer or a plotter and is displayed on a handout, a flip chart, or a transparency. With hard copy you will be more concerned with pages than screens, although



Presentation graphics alternatives: from idea to output

you will be integrating screens of information into the printed material.

Making hard copy gives you an additional tool to work with—font programs. These are programs that allow you to print in different type styles and sizes. A font program is especially important if you do not have graphics in your presentation. Essentially, a font program is a printer driver that formats an ASCII text file based on commands you embed with a word processor. You specify the fonts you want to use by embedding commands within your document. Then the font software controls the printing.

Make certain the font program supports the printer or plotter you are using—font programs are usually

You can print a chart with a graphics program and then print text around it with a font program.

device-specific. Also, be sure it has the fonts and sizes you desire. Some programs are very limited, while others even allow you to create your own fonts. Once again, try not to get carried away. If you use too many fonts or font sizes on one page, you will distract your audience from the concept you are trying to communicate.

Getting standard text, special fonts, and art all on the same page in the correct positions requires planning. You can resort to scissors and glue, but why not use the capabilities of the computer? It is not difficult to print the text and fonts in one pass, then roll the paper back and print the art in another. Multiple passes also allow you to use a plotter to prepare the artwork and a printer for the text

Sample Graphics Software

The following graphics packages are mentioned in this article:

PC Projector
PC Solutions
628 Hobart Terr.
Santa Clara, CA 95051
408/243-4169
List price: \$39.95 (includes PC Title)
Requirements: 128K, one disk drive, color graphics board

4-Point Graphics 1.0
Imsi Software Publishers
633 Fifth Ave.
San Rafael, CA 94901
415/454-7101
List price: \$195
Requirements: 128K, color graphics board

Energraphics 1.2
Enertronix Research, Inc.
150 N. Meramec #207
St. Louis, MO 63105
800/325-0174, 314/725-5566
List price: \$350, plotter driver \$100
Requirements: 128K, color graphics board

Executive Picture Show 0.3
PCsoftware of San Diego
9120 Grammercy Dr. #416
San Diego, CA 92123
619/571-0981
List price: \$195
Requirements: 128K, two disk drives, color graphics board

Execuvision
Prentice-Hall, Inc.
Route 9W
Englewood Cliffs, NJ 07632
201/592-3283
List price: \$395
Requirements: 128K, two disk drives, color graphics board

Pyxel Visuals 1.5 (font program)
Pyxel Applications
2917 Mohawk Dr.
Richmond, VA 23235
804/320-5573
List price: \$98
Requirements: 128K, color graphics board

(plotters do not normally produce small type as well as printers do). You can also print a chart with a graphics program and then print text around it with a font program.

Making Transparencies

Once you have generated a hard copy, it is easy to make transparencies for an overhead projector. Almost any print shop can make them for 50 cents to \$2 per sheet. Some shops even make multicolor transparencies. If you have a photostatic copier in your office, you can probably make the transparencies yourself, but be sure to read the copier's in-

struction manual first. Not all copiers make transparencies, and those that do may require special switch settings to do so. If your copier does make transparencies, be sure to use the correct material; not all clear plastic or mylar intended for transparencies is suitable for photocopying. If you use the wrong kind, you can end up with a sticky, smelly mess that will cost you hundreds of dollars to clean up.

**FAST SERVICE!
LOW PRICES!
GOOD TECHNICAL ADVICE!**

SPECIAL: WORDSTAR FOR PC — \$269

COMPUTERS

IBM PC:	CALL!	SEEQUA:	\$1649
COLUMBIAPC:	CALL!	HYPERION	\$CALL
CORONAPC:	CALL!	OTRONA:	\$CALL
EAGLEPC 2:	\$2699	ZENITH Z100	\$CALL
OSBORNE EXEC:	\$2295		

HARD DISK DRIVES & TAPE DRIVES

VRDATA 10 MB	CALL	GENIE X5P	CALL
CORVUS 6 MB	1995	GENIE 5 + 5 MB	3399
CORVUS 11 MB	2695	GENIE 20 MB	CALL
CORVUS 20 MB	3395	TALLGRASS	CALL
CORVUS MIRROR	675	DAVONG 10 MB	CALL
CORVUS/PC INTFC	250	DAVONG TAPEBKUP	CALL
TECMAR 10 MB	CALL	CORONA 10 MB	CALL

PRINTERS

GEMINI 10X	299	EPSON RX80	399
NEC SPIN 7730	1950	EPSON FX80	CALL
NEC SPIN 3530	1549	EPSON FX100	CALL
NEC SPIN 3550	1850	PRISM 132	CALL
C. ITOH F10 (PAR)	1149	C. ITOH PROWR. 1	375
BROTHER HR 1	749	C. ITOH PROWR. 2	675

MONITORS

USIPI3 Amber	149	TAXAN Amber	149
AMDEK 300 Green	149	NEC JC1203	CALL
AMDEK 300 Amber	159	PRINCETON HX12	569
AMDEK Color II	469	ZENITH ZVM-121	100

MODEMS

HAYES SMART 300	199	NOVATION SMART CAT	415
HAYES SMART 1200	499	NOVATION 212 AUTO	569
HAYES SMART 1200B	445	SSM TRANSMODM 1200	525

BIZ SOFTWARE

TCS Accting Pkgs:	CALL		
State-of-the-Art: G/L, A/R, A/P, PAY, INV, WP, etc.	CALL		
Software Dim.: G/L, A/P, A/R, PAY, INV, etc.	CALL		
Peachtree: (GL/AR/AP) 299	CALL	Peach Pack 5000	CALL
Perfect Pkgs. Low! Low!	CALL	dBASE II	399
FAST GRAPHS	99	MULTIPLAN	179
VISIFILES	225	VISCALC	169
PFS File	95	EASY FILER	249
CONT. HOME ACCT	90	TK SOLVER	215
PEARLSOFT	199	LOTUS 1-2-3	CALL

WORD PROCESSORS

WORDSTAR	269	VOLKSWRITER	99
PFS Write	CALL	IUS Easywriter II	225
Perfect Writer	199	Perf. Wrtr/Splr	299
MultiMate	335	Benchmark	CALL

BACKUP SOFTWARE

COPY PC	35	MLI Disk Mechanic	CALL
---------	----	-------------------	------

FLOPPY DISKS

ELEPHANT DSDD-5"/BX 30	CALL	MAXELL DSDD-5"/BX	CALL
VERBATIM DSDD-5"/BX	CALL	DYSAN DSDD-5"/BX	CALL

ADD-INS + ADD-ONS

OUADLINK/APPLE	CALL	AMDEK MAI Color Bd	CALL
Hercules Gr. Cd	CALL	Microsoft MOUSE	149

Terms: Prices include 4% cash discount. Add 4% for Credit Card, 12% for Purchase Orders, and Foreign Orders. Free shipping for surface, domestic shipments. Connecticut buyers add 7.5% Sales Tax.

Not responsible for typo. errors. Prices subject to change and offering subject to availability.

**(203) 579-0472
CONNECTICUT
INFORMATION
SERVICES, INC.
218 Huntington Road
Bridgeport, CT 06608**

● Hands On

If you have a plotter, you may be able to print directly on the plastic or mylar sheets. Since not all ink will dry on mylar, be sure you have the right pens for the job. A number of products for enhancing your transparencies are available from art supply stores, including colored mylar, color stick-ons, and colored pens for direct drawing.

In general, presentations using transparencies should use a "progressive revelation" approach. Don't show an entire transparency at once; if you do, your audience will be more concerned with reading ahead of you than with listening to what you say. You can avoid this problem by using masks or overlays. A mask is a sheet of paper that you slide down the transparency as you speak, uncovering each point at the appropriate time. Use a heavy piece of plain paper for the mask so writing won't show through.

An overlay is a second transparency laid on top of the first. The art or type on the second should fit the art on the first, like pieces of a puzzle. This is an effective technique to use with charts, so you can show part of a chart at a time. You can use four or five overlays before the thickness of the mylar makes the projected image unreadable, but you will probably find that using more than two overlays on one base sheet becomes cumbersome. The biggest problem with overlays is getting them to align correctly. It is easy to get one reversed, and they often slip around as you are speaking. You can solve these

problems by taping the sheets together at the top or the side with transparent tape, then folding them together like pages of a book.

When you store transparencies, do not lay them directly against each other; the ink or electrostatic toner may transfer from one sheet to another. The sheets may stick together permanently. Even typewriter ink on a sheet of paper will eventually transfer to them. Store transparencies in a file folder or notebook with a sheet of plain white paper between them.

Legibility is even more important for screen projections than for hand-outs. Use a good ribbon when printing transparencies, and make sure they are sharp and clear. Arrange your transparencies in the order in which they will be used before you start your presentation, and be sure you have a place to lay them after they are used. Clean your projector lens with a soft, lint-free cloth before you begin. Position the screen to avoid glare. The lighting in the room should be subdued—not dark. And one more thing—don't forget to bring a spare projector bulb. ●

Bill Crider, formerly managing editor of Computer Skill Builders, is a freelance writer and computer training consultant in Tucson, Arizona.

INTRODUCING A FINANCIAL SOFTWARE PROGRAM FOR A MILLION DOLLARS.

No, it doesn't cost a million dollars. But it can help you manage it. Or accumulate it. Or maybe even multiply it. You see, MoneyTrack charts where your money comes from. And where it goes. MoneyTrack is capable of handling up to 99 funds, 99 different businesses, 900 ledger accounts, and 900 ledgers for securities, payees, and rental units. Then, following your instructions, MoneyTrack analyzes the transactions, sorts them out, sums them, and produces comprehensive personal financial reports.

MoneyTrack also creates files for spreadsheets and other programs.

In short, MoneyTrack is the only program specifically designed to handle a wealth of investments for those with multiple sources of income. And for those with diverse investments and complex tax returns.

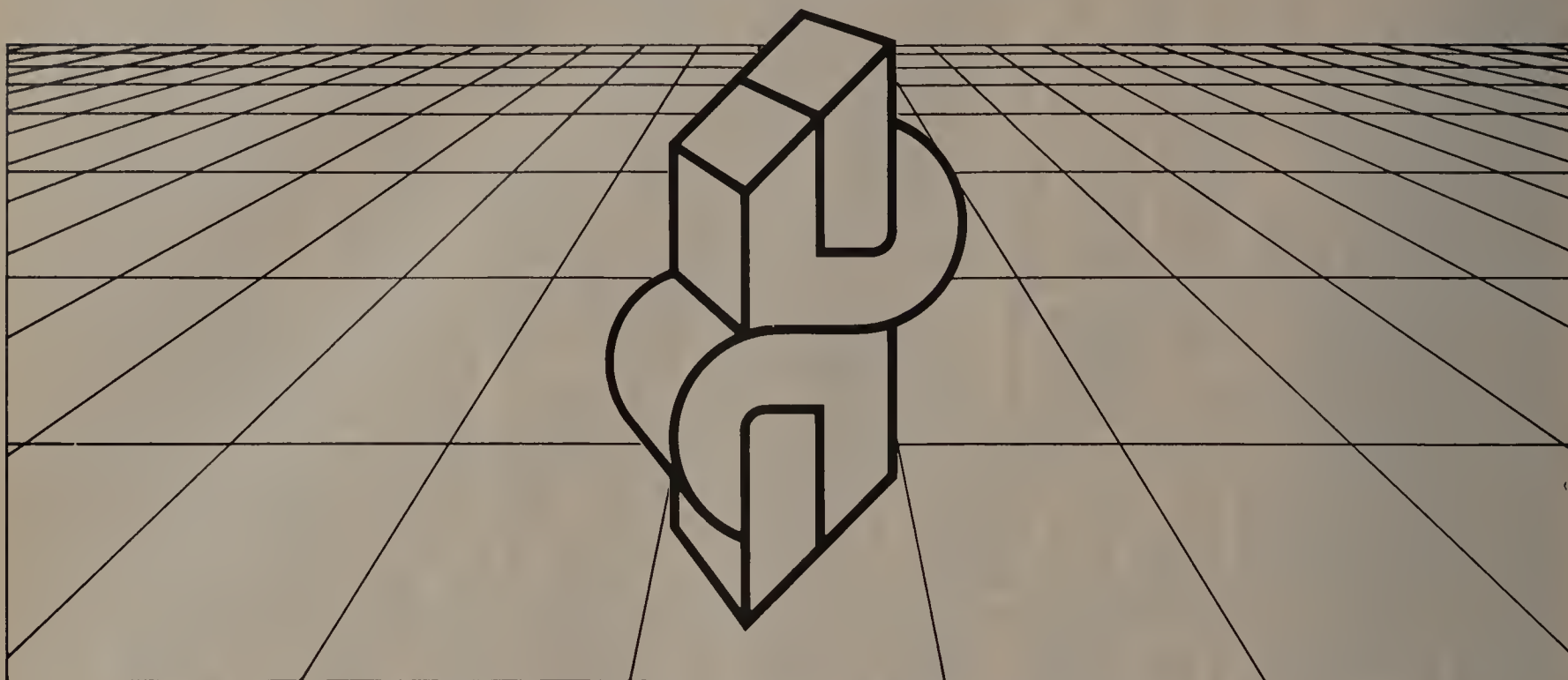
MoneyTrack runs on the IBM Personal Computer, IBM PC/XT, most of the compatibles, and other MS/DOS computers. File size permitting, you can move back and forth between fixed-disk and dual diskette operation.

MoneyTrack is programmed to be the best personal financial program available today. It won't cost you a million dollars. But it may certainly be worth it.

MoneyTrack™

For information and free eight-page brochure, call Pacific Data Systems, Inc. at 800-343-9194 outside of California, 800-421-4706 in California, and 559-8713 in the 213 area code.

Nothing Moves but Pure Data.



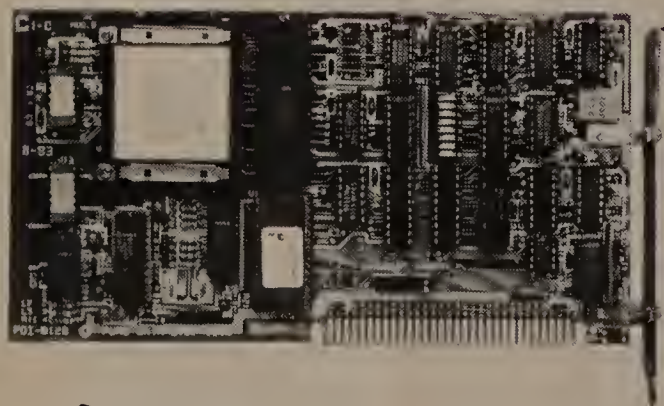
Bubble Storage for the PC and PC XT.

Bubble memory combines the best features of disk and solid state memory with extreme reliability. Unlike a floppy disk, it's entirely solid state with no moving parts. This makes it impervious to dust, dirt, fumes, and vibration. And, unlike normal memory, it doesn't lose data when the power goes off.

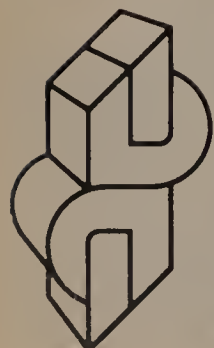
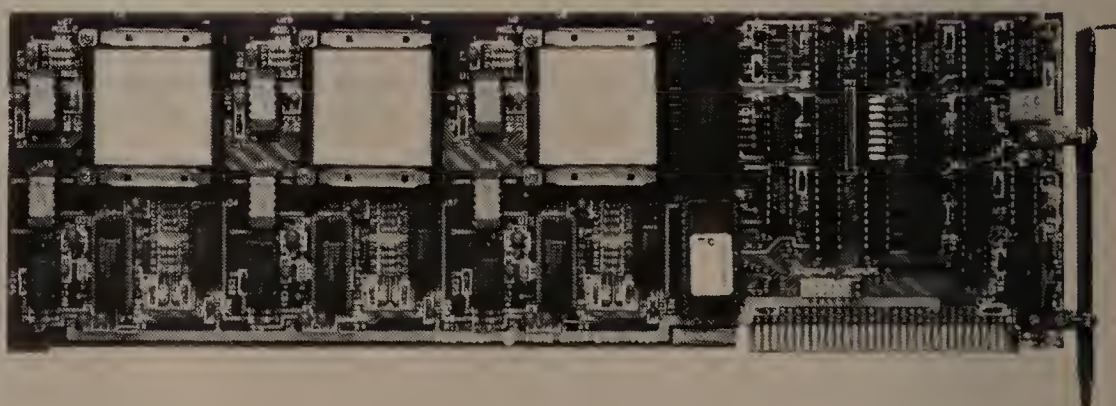
Now you can enjoy all the advantages of bubble memory combined with the famous Pure Data quality and reliability for your IBM PC or XT.

- PDIB-128 provides 128 KBytes
- PDIB-384 provides 384 KBytes
- PDIB-512 provides 512 KBytes
- Not affected by power failure
- "Boot" from bubble available for a totally diskless environment
- Extremely reliable
- Standard DOS 2.0 disk-type device
- Compatible with all DOS software
- No patching of any system files
- Password option for computer and/or bubble
- Password cannot be bypassed by software
- Comprehensive diagnostics and other utilities
- Fully illustrated installation and operation manual
- Technical support hot-line
- Guaranteed 48 hour service
- Bubble uses 2 I/O addresses and no memory space
- Interrupts are supported but not required
- DMA is supported but not required
- On-board EPROM socket
- Pure Data quality and reliability
- No moving parts
- 512 KBytes, 1.5 MBytes and 2.0 MBytes available soon

PDIB-128



PDIB-384



Pure Data Ltd

860 Denison Street,
Markham, Ontario, Canada L3R 4H1

☎ (416) 475-3370 ☎ (416) 494-9563

Pure Data products are available through:

In the USA: OMEGA ☎ (512) 251-4151
(214) 234-6900
(201) 464-5060

In Canada: Keysoft International, ECOSEA Technologies,
Computerland, Computer Innovations,
Crowntek Technologies ☎ (416) 493-0800

In Europe: Garingdell Systems Ltd. ☎ 0753 883036

IBM is a registered trademark of International Business Machines Corporation.

Circle 147 on reader service card

JUKI 6100. HARDWARE WITH NO SOFT SPOTS.

	Brother HR15	Brother HR25	Silver Reed 500	Silver Reed 550	Silver Reed 770	Transtar 120	Transtar 130	Diablo 620	Qume LP20	Smith Corona TPH+	TTX 1014	JUKI 6100
Costs under \$600	●		●			●				●	●	●
18 cps min. speed		●			●		●	●	●			●
Buffer memory	●	●			●			●	●	●		●
Proportional spacing	●	●		●	●		●	●	●			●
Prints graphics	●	●	●	●	●	●	●	●	●		●	●
11" min. print line	●	●		●	●		●	●	●		●	●
100-character wheel												●
Orig. + 3 copies or more	●	●	●	●	●	●	●	●	●	●	●	●
62 dbA noise level or less								●	●			●
Linear stepper carr. motor						●	●			●		●
Buffer expandable to 8K	●				●						●	●
Weights under 35 lbs.	●	●	●	●	●	●	●		●	●	●	●

Note: Above chart is an art treatment and was not printed by the JUKI 6100.

THE JUKI 6100: Feature for feature, the best all-round printer. We challenge our competition to beat our overall record. Dollar for dollar, JUKI gives you more of what you want in a daisywheel printer. And no wonder: we've been building quality precision machinery for over 45 years. So for a printer that works . . . and works . . . and works, choose JUKI. Ask to see the JUKI 6100 at your local JUKI dealer.



JUKI®
The worker.

JUKI INDUSTRIES OF AMERICA, INC.

ACORN DATA PRODUCTS
7042 S. Revere Pkwy, Ste 50
Englewood, CO 80112
(303) 799-8900
Serving:
MT, WY, CO, UT, NM

BUTLER ASSOCIATES, INC.
82A Winchester St.
Newton, MA 02161
(617) 964-5270
Serving:
ME, NH, VT, MA, CT, RI

CM DISTRIBUTION
7023 Little River Tnpk.
Annandale, VA 22003
(703) 750-3885
Serving:
MO, DE, OC, VA

COMPUTER SERVICES INTL
560 Sylvan Ave.
Englewood Cliffs, NJ 07632
(201) 569-6300
Serving:
METRO NY, E. PA, NJ

CYPRESS DISTRIBUTING CO.
1266 Lincoln Ave., Ste 109
San Jose, CA 95125
(408) 297-9800
Serving:
N. CA, NV, AZ

GENTRY ASSOCIATES INC.
7665 Currency Dr.
Orlando, FL 32809
(305) 859-7480
Serving:
TN, NC, SC, MS, LA, AL, FL, GA

INFORMATION SYSTEMS INC.
2420 E. Oakton St., Unit K
Arlington Heights, IL 60005
(312) 228-5480
Serving:
WI, IL, MN, IA, MO, NE, NO, SO, KS

MICRO SOURCE OF TEXAS INC.
670 International Pkwy
Richardson, TX 75081
(214) 690-5111
Serving:
TX, OK, AR, LA

OSSMANN COMPUTER TECHNOLOGIES
6666 Old Collamer Rd
East Syracuse, NY 13057
(315) 437-6666
Serving:
UPSTATE NY

SOUTHERN MICRO DISTRIBUTORS
8708 Royal Lane
Irving, TX 75063
(214) 258-6636
Serving:
TX, OK, AR, LA

STAR-TRONIC DISTRIBUTING CO.
23976 Freeway Park Dr.
Farmington Hills, MI 48024
(313) 477-7586
Serving:
MI, IN, OH, KY, W. PA, WV

TECHNOLOGY MARKETING CORP.
2300 Valley View Lane, Ste 109
Dallas, TX 75234
(214) 243-7994
Serving:
TX, OK, AR, LA

VITEK
930G Boardwalk Ave.
San Marcos, CA 92069
(619) 744-8305
Serving:
S. CA

WESTERN MICRO TECHNOLOGY
10040 Bubb Road
Cupertino, CA 95104
(408) 725-1660
Serving:
N. CA, NV, AZ

NATIONAL HEADQUARTERS: JUKI INDUSTRIES OF AMERICA, INC. OA DIVISION
299 Market St.
Saddle Brook, NJ 07662
(201) 368-3666

WEST COAST: JUKI INDUSTRIES OF AMERICA, INC. CALIFORNIA DIVISION
3555 Lomita Blvd.
Torrance, CA 90505
(213) 325-3093

Circle 627 on reader service card

The Right Commands At Your Fingertips

KLEERTEX

... For Your IBM®-PC/XT!

and 20 other name brand computers!

MOST **\$19.95** EACH
TEMPLATES (See graph below)

Designed by Training Specialists to help put your program to work, right away!

- Complete commands required to learn and operate your program
- Alphabetized commands to find what you need quickly and easily
- Organized with key-by-key examples for simplicity

This Time-Saving Aid is Ideal for Training, Invaluable for Beginners, and a welcome convenience for the Comprehensive User. Made of sturdy, non-scratchable, non-glare, color-coordinated plastic.

The right commands... ..the right price!

Availability and Price Codes:

- ▲ \$ 8.95 Do-It-Yourself Blanks
- \$19.95 Single Program Templates
- \$32.95 Double Program or Extensive Program Templates.

Call Us About Custom Templates

All templates, except those for Kaypro and Osborne, are reversible. The reverse side contains additional commands or Do-It-Yourself blank lines.

	WORDSTAR®	DBASE II®	MULTIPLAN®	SUPERCALC®	SUPERCALC®	EASYWRITER® II	APPLEWRITER® II	PIE WRITER®	APPLEWRITER® II	PERFECT WRITER®	PERFECT CALC®	MULTIMATE®	PERSONAL PEARL®	DO IT YOURSELF BLANKS	1-2-3®	VISCALC®
IBM® STYLE A*	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
IBM® STYLE B**	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
KAYPRO®	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APPLE® II+	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
APPLE® //e	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
OSBORNE®	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

*IBM STYLE A Fits: IBM-PC/XT, COMPAQ, LEADING EDGE and PANASONIC SENIOR PARTNER.

**IBM STYLE B Fits: COLUMBIA, OLIVETTI, CORONA, TAVA, IVY, PRONTO, SILICON VALLEY MICRO, NORTH STAR DIMENSION, LOGICAL L-XT, IMP and SPERRY-PC.

Apple/Quickfile-Apple Computer, Inc., IBM-International Business Machines, Osborne-Osborne Computer Corp. Kaypro-Non Linear Systems. Wordstar/Mailmerge-MicroPro Int'l Visicalc-Visicorp Supercalc/Supercalc2-Sortim Easywriter II-Information Unlimited Software dBase II-Ashlon-Tate. Multiplan-Microsoft. 1-2-3-Lotus Dev Corp. Perfect Writer/Perfect Filer/Perfect Calc-Perfect Software Personal Pearl-Pearlsoft. PieWriter-Hayden Software Co. Compaq-Compaq Computer Corp. Multimate-Softword, Co

©CREATIVE COMPUTER PRODUCTS 1983

Circle 634 on reader service card

15 DAY MONEY-BACK GUARANTEE

Call Toll Free
1-800-231-5413

California 1-800-523-5441

DEALER INQUIRIES INVITED



P. O. Box 85152-MB134
San Diego, CA 92138
(619) 268-0793

We accept VISA, MC, AMEX or checks.
\$1.95 Shipping Fee

WESTERN CANADA:
LD COMPUTERS
12831 HORSESHOE PL.
RICHMOND, B.C. V7A 4X5

EASTERN CANADA:
TRILLIUM COMPUTER RESOURCES
423 GRANGEWOOD DR
WATERLOO, ONTARIO N2K 2H1

Prentice-Hall speaks an IBM language other publishers have forgotten. **English.***



THE IBM PC/XT GRAPHICS BOOK by John Fowler, Ph.D. An example-packed IBM BASIC graphics tutorial. Covers both simple and advanced concepts for business and pleasure. \$16.95



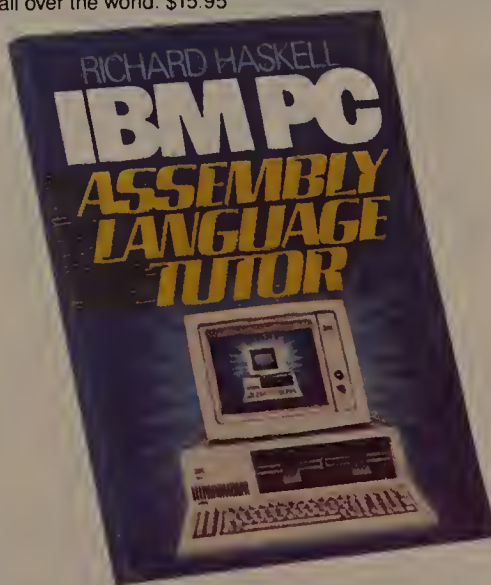
TELECOMMUNICATIONS WITH THE IBM PCjr by David W. Carroll. How to use the new IBM PCjr as a home communications terminal for gaining access to data-bases, sending and receiving electronic mail, and communicating with other computers all over the world. \$15.95



GETTING THE MOST FROM WORDSTAR™ AND MAILMERGE™ Things Micropro Never Told You by M. David Stone. Exciting new ways to take full advantage of these two highly popular word-processing programs. \$14.95



CROSS REFERENCE UTILITY (CRF): A Programming Aid for the IBM PC by The Sumar Corporation. Provides a complete reference listing of variables in a BASIC program in order to review, analyze, and modify programs for maximum capability. \$29.95



IBM PC 8088 ASSEMBLY LANGUAGE TUTOR by Richard Haskell. Part of the leading series in assembly language tutorials, this edition covers 8088 arithmetic, branching instructions, graphics, addressing modes, and much more. Enables mid-level users to maximize machine potency. \$34.95



SCIENCE AND ENGINEERING PROGRAMS FOR THE IBM PC by Cass Lewart. With comprehensive prompting and error trapping, these programs cover problems in electrical engineering statistics, queuing theory, reliability, curve fitting, along with many other related technical disciplines. Book/disk available. \$9.95

PRENTICE-HALL BOOKWARE™/THE LEADER IN COMPUTER PUBLISHING

For more information about our computer books and software, write to us at the address below. Dealer inquiries welcome.
Prentice-Hall, General Publishing Division, Englewood Cliffs, N.J. 07632

* We guarantee that all our guides are easy to read and simple to apply without the aid of a reference library, a computer salesperson, or a niece who just graduated from M.I.T.

Circle 19 on reader service card

259



THE ACCOUNTING SYSTEM FOR EXECUTIVE DECISIONS

Fast, accurate information is vital to the executive decision making process. Barron Ross Accounting software, designed for the IBM PC, is a fast, completely integrated accounting system for small-to-medium sized businesses.

We've designed our accounting process specifically to save you time. Data is entered just once, and each software module immediately posts its transactions to the General Ledger.

You can expand your Barron Ross software system from a single IBM PC to as many as twenty-four stations with Execu-Net, the Barron Ross office information network.

Execu-Net compiles information

from each work station to quickly create cumulative financial reports. Operators can simultaneously share the same accounting program, spreading the workload among several work stations.

The Barron Ross software line includes:

- General Ledger*
- Accounts Receivable*
- Accounts Payable*
- Inventory*
- Payroll*
- Sales Order*
- Purchase Order*
- Point of Sale*
- Business Graphics*
- Communications*

Now that we've given you a new dimension in computerized accounting, you can relax with Barron Ross knowing you are keeping pace with today's financial world.

Barron Ross

SOFTWARE DESIGNED for BUSINESS

10933 Trade Center Drive
Rancho Cordova, CA 95670
916/638-0475 800/238-3243

A Computermate Corporation

IBM is a trademark of International Business Machines. Execu-Net is a trademark of Computermate, Inc.

Circle 747 on reader service card

60-Second Slides

Polaroid's instant slide generator, the Polaroid Palette, is run through its paces with 4-Point Graphics and Graphwriter.

Cindy Hamburger

The Polaroid people have long been the undisputed leaders in the field of instant pictures. They had the foresight to invest in the genius of Dr. Edwin H. Land, the inventor of the 60-second Land camera, back in 1948. Within eight years over 1 million Polaroid Land cameras had been manufactured and distributed throughout the world.

Polaroid has continued to dominate the instant camera market they created and to introduce innovation after innovation. Now Polaroid has introduced its formula for immediate gratification into the computer marketplace with the Polaroid Palette, a desktop camera that shoots CRT (cathode ray tube) screens and creates color slides and prints in 60 seconds.

The purpose of the Palette is to generate hard-copy computer graphics with a variety of media and devices, including color slides, instant prints, computer printers, and graphics plotters. With the Palette, businesspeople can quickly create slides captured from graphics software, and artists can photograph their own creations from graphics packages designed to create free-form art.

In the variety of computer slide generators currently on the market, this camera stands alone in sophistication. The simplest and most inexpensive slide generator, the Instagraphic, is manufactured by Polaroid's arch rival, Eastman Kodak. The Instagraphic combines a light-shielding rubber hood with a detachable Kodak instant camera. The VideoSlide 35, manufactured by Lang Systems (see "Screen Shots," PCW, Vol. 1, No. 5) is still the easiest and most reliable screen camera of

all. At the other end of the spectrum are a handful of fully electronic film recorders with price tags starting at \$10,000. The Polaroid Palette is the only camera that combines software with a full exposure and developing system.

Cameras, Cables, and Challenges

The main component of the Polaroid Palette is the 12¾- by 7¾-inch recorder (exposure unit). The recorder consists of a black-and-white monitor and a red, blue, and green color wheel. The package also includes two cameras that attach to the front of



Processed Polaroid slide film with silver backing



the recorder, a 35 millimeter (mm) Minolta camera that comes with a slide film processor, and a 3¼- by 4¼-inch Polaroid Land camera for shooting instant pictures.

The Palette package includes a number of components for shooting, developing, and mounting prints and slides, and all the necessary cables to tie the parts together (RS-232C, video I/O, camera synchronization, and power cord). A serial port and a color graphics board are required, but you don't need a color graphics monitor.

The cameras are adaptations of the commercial versions of the Minolta and Land cameras. The 35mm motor-driven Minolta accepts standard lenses, although the lenses are not included in the purchase price. The Minolta and Polaroid Land cameras are not completely compatible with the PC, because Polaroid tried to cut costs by using the same optical configurations for both. This setup causes the displayed image to be both reversed and upside down when seen with the Polaroid Land camera. In addition, since the Palette is capable

of producing more colors than the monitor can display, changes to the color palette are never reflected on the monitor. In other words, what you see is not what you get.

The Palette's documentation is done in typical Polaroid plastic-coated, glossy rag. It is attractive, ac-

Fortunately, Polaroid knows how to use its patent on immediate gratification.

curate, and informative. With a little added grease it could pass for a car mechanic's manual, and it should be used in the same way. Even computer experts will constantly need to refer to the manual for operations such as loading the film, switching camera backs, and checking the motor drive batteries. Experienced photographers, even gadget-oriented types, will find the massive cabling between exposure unit, camera, and computer challenging.

The Polaroid Palette is packaged with two types of film: Polacolor Type 669 for instant prints and Polachrome 35mm film for slides. You can also configure the program to run with Ektachrome (ASA 64), Agfachrome (ASA 100), or Fujichrome (ASA 100).

The black-and-white CRT inside the recorder is flat, tending slightly toward the convex to correct any parallax distortion. The image you photograph is displayed on the screen and is colored during exposure, providing a higher-resolution image than that produced on a color monitor. The image is exposed to the film in three stages. The shutter of the camera remains open as the color wheel spins, exposing first the red, then the blue, then the green portions of the image, which are mixed during processing of the film.

Exposures are made directly from the recorder's monitor and not from your own monitor. The quality and



(1) Polaroid developing tank, (2) Slide mounter, (3) Land camera, (4) 72-color palette, (5) Exposure unit with Minolta camera, (6) Developing pod for processing film

aspect (the ratio of horizontal and vertical distances) of your monitor and of your color graphics board, therefore, will not affect the quality of the photographed image.

Installing the Software

The installation program for the Polaroid Palette is covered in the Setting Up and Tutorial sections of the manual. After you configure the Palette software (called the Palette Program) for the correct number of disk drives and the correct communications protocol, the manual gives instructions for photographing five test prints. This takes 2 to 3 tedious hours and a lot of trial and error. Once installed, however, the software is completely menu-driven and responds diligently without mishap or rudeness. The function keys take you back and forth between menus or return you to DOS.

The tutorial guides you through the 64 steps you will be called upon to repeat every time you want to take a picture. Fortunately, Polaroid knows how to use its patent on immediate gratification: you are rewarded for all your efforts with five perfectly developed prints and a fa-

miliarity with the keyboard operations necessary to run the software.

The first two exposures you make with the Palette Program are Color-Key and ColorSets. These are color tables to which you can refer when making exposures (see Figures 1 and 2). ColorKey shows the 72 colors available for recoloring images. To set exposure or to recolor a graphic image, you are required to select a combination of a color (from colors A through H) and a value (from values 1 through 9). It is better to consult this chart when selecting the exposure than to take a shot in the dark.

The ColorSets menu shows eight preselected color sets that can be substituted for an image's original colors. Sets 1 and 2 of this table are the same as the PC's palette "0" colors—red, green, and brown—and the PC's palette "1" colors—cyan, magenta, and white. The Palette Program expands the normal capabilities of the PC, permitting you to use eight different color sets of three or four colors each.

Using PSAVER

Polaroid currently claims that the Palette supports over a dozen graphics programs, including *Artist*, the PC-DOS version of *BPS Business Graphics*, *Chartman*, *Chart-Master*, *Energraphics*, *Fast Graphs*, *Graphmagic*, *1-2-3*, *Mirrorgraph*, *pfs:Graph*, *Sign-Master*, and *Visitrend/Plot*. I tested the camera with *4-Point Graphics* by Imsi Software Publishers, a simple line-drawing program that is valuable for creating geometric shapes such as squares, circles, or parabolas. *4-Point Graphics* is not included in Polaroid's list, but I found no problems with compatibility.

4-Point Graphics has its own palette program, and colors can be manipulated on the screen before a photograph is taken. The color indicator bar on the status line is located on the top left side of the screen. If you want to change all greens to reds, for example, toggle the <F1> and <F2> keys until the color bar on the status line indicates the color green, then use the <F3> and <F4> keys to change the color bar to show red. Toggling the <F5> and <F6> keys lets you change the background col-

● Hands On

ors. To erase, paint over your errors with the background color. To save the color conversion, type A. To restore the picture to its original colors, press <Backspace>.

You can make additional color changes to a graphic created with separate graphics software by saving the graphic with Polaroid's PSAVER utility. Once you are satisfied with a screen created with a graphics program, save the file to disk, then load

In a minute and a half
you can be holding a
developed roll of slides.

the Palette Program and type PSAVER at the A> prompt. This loads PSAVER into memory. You then remove the Palette disk, reinsert the disk that contains the graphic, and bring the graphic to the screen. Press <Shift>-<PrtSc> to save the graphic in the correct format. You can now use the Polaroid Palette to manipulate the colors of the graphic.

The moment the thought of taking a picture crosses your mind, reach over and turn on the Polaroid recorder. The recorder takes 20 minutes to warm up, about the same length of time it takes to run through the software menu session. To photograph the image with the Palette, return to the main menu and press <F6> for a catalog of the images stored on the current disk. Once you have selected an image to photograph, press <F3> to load the file.

Images saved with the PSAVER command will have a file extension starting with .P, such as .P40. The file extension .PXY means that PSAVER was not able to determine the source of the image. If you try to load an

image that has a .PXY extension, you will be asked to specify an "image type classification." For example, if you're trying to load an image created with Lotus's 1-2-3, you would choose option 1 to indicate a medium-resolution, four-color graphic.

To take a picture of the selected image, press <F8> to get to the Exposure menu and press <F8> again to expose the current image.

Using the camera is simple. You make an exposure by pressing the <Space> bar. A motor drive attached to the base of the Minolta automatically advances the film when the exposure is complete. To shoot instant prints, you have to remove the dark slide on the Land camera first. However, the menu prompts you for this action as well as alert you with a tune when the exposure is complete. Processing of the slides is done in Polaroid's state-of-the-art instant slide film processor. In a minute and a half you can be holding a developed roll of slides. A slide-mounting machine and 25 mounts are included for framing finished slides.

Graphwriter

Not all graphics programs are compatible with the Palette Program or the PSAVER utility. For example, the *Koala Pad* was tested using the PSAVER command, and the result was a rendition of the image in black and white. The Palette Program is designed to record only IBM-standard, medium-resolution and high-resolution screen images. The program does not currently support the plethora of high-resolution graphics boards such as Plantronic's ColorPlus board.

One graphics program, *Graphwriter*, is highly compatible with the Palette because it incorporates the Palette's software. Graphic Communications bought the license to the

Palette Program and merged the program with a chart generator and an artist program. The most efficient way to use *Graphwriter* is to generate presentation graphics with *Graphwriter* and photograph them using the Polaroid recorder.

The special version of *Graphwriter* for use with the Polaroid recorder requires 256K of memory and comes with the UCSD p-System operating system. To anyone accustomed to working with DOS, installing a disk using the p-System feels like being lost in a jungle.

To begin work with *Graphwriter*, follow the instructions for creating and photographing a sample bar chart. Position the recorder between the system unit and the monitor, leaving ample air space between the units to prevent overheating or electrical interference. Try to avoid punching, abusing, or otherwise moving the Palette during operation; vibrations may cause your pictures to blur. Mixing cables and wires should also be avoided.

Once you have generated the graphic, return to the main menu and select Change Plot Options, then select the Options menu. For your first dry run you should probably rely on the defaults incorporated in the Options menu. Make as many exposures as necessary to get the correct mixture of color and text.

Graphwriter defaults to Polarochrome slide film every time you create an image, so if you want to make prints, use the Options menu to change the film type. Whatever hardware you intend to use to produce output (printer, plotter, or Polaroid Palette), you should then go to the Style menu to change titles, text, or color.

If it is text that you want to capture, *Graphwriter* is the answer. There are 12 font types from which to choose. The program defaults to different font types depending on the

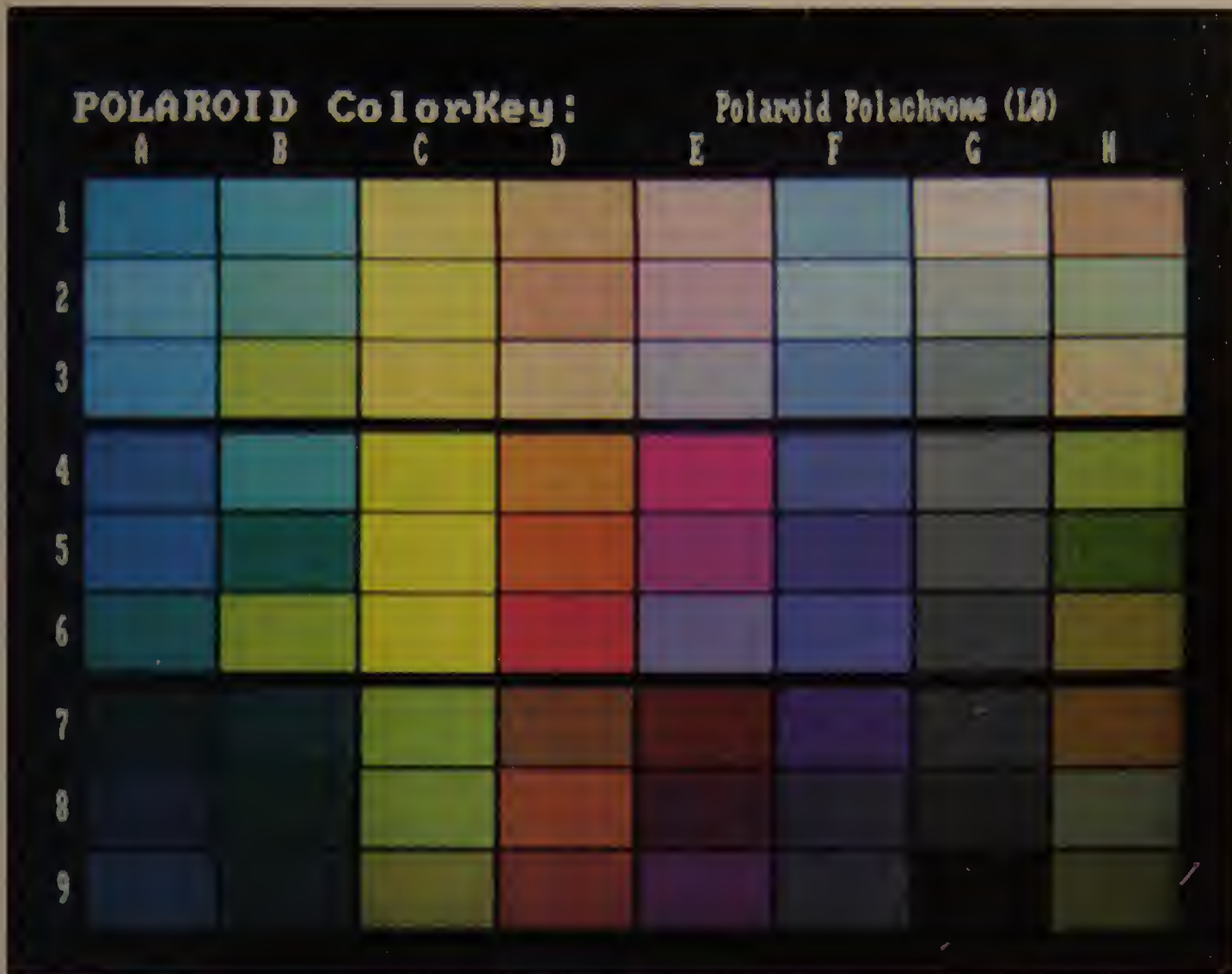


Figure 1:
The Polaroid
ColorKey

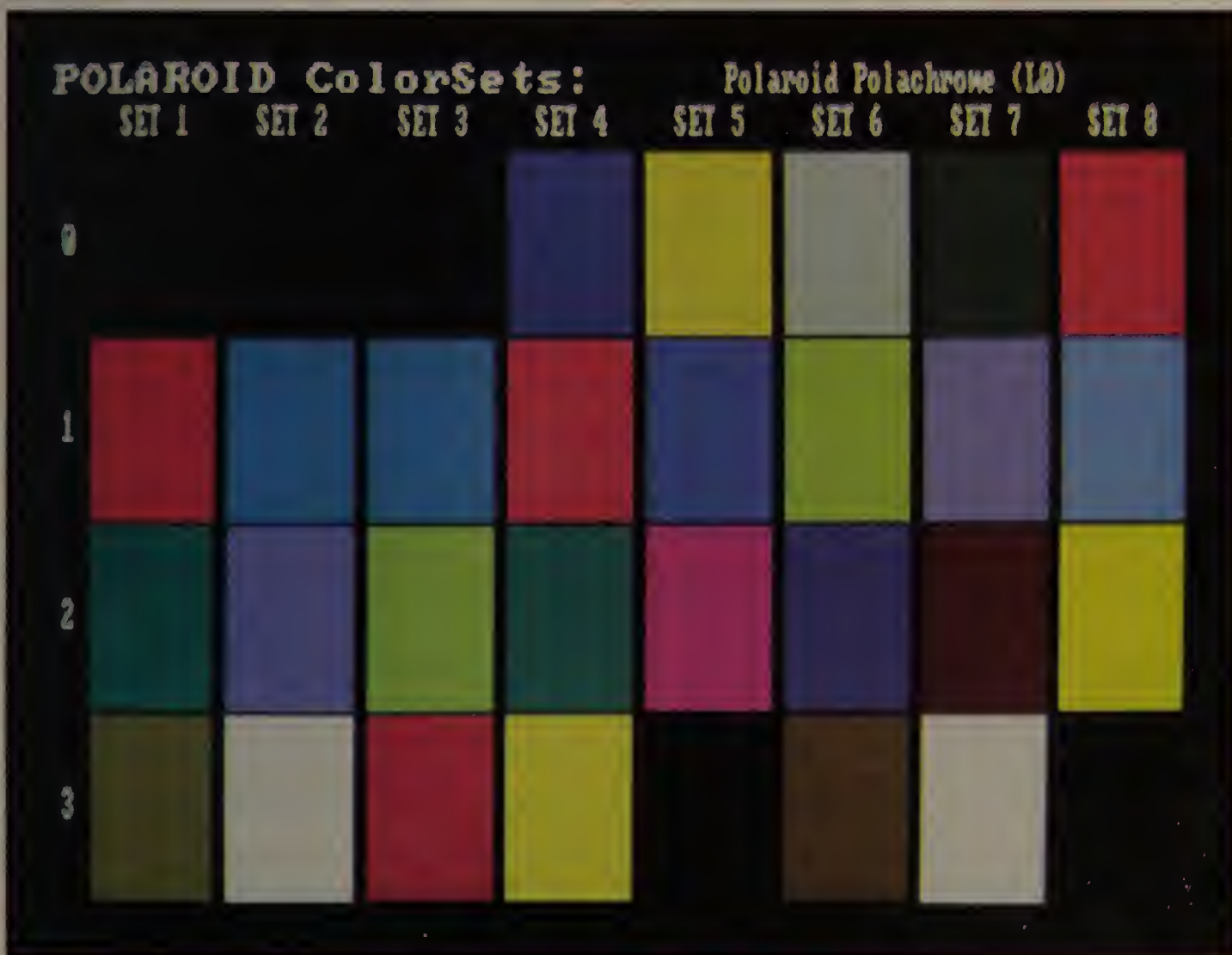


Figure 2:
The Polaroid
ColorSets

PC WORLD

Don't miss our
special subscription offer.

See page 64 for details.

● Hands On

graphics output device you are using. The text font for *Graphwriter* defaults to edge, which means that each text character is delineated with a 1-pixel outline of a color you choose. You can also choose font size. Text height can range from 1mm to 8mm (35 pixels).

Waiting for the compiler to translate an entire program again and again can lead to bad work habits (and coffee addiction).

Since color changes are indiscernible on your monitor, it often takes a test exposure to realize that you have chosen the wrong mixture of colors. The *Graphwriter* standard background color is Ice Blue (A2). Background colors should be different from any other chart element. Black (G9) is a good choice. You can designate 12 colors to a bar or use one of the eight color sets. Color set 8, "Exotic," combines Tangerine (C6) with Liz Taylor (E6) to create a bright magenta. For a low-key, relaxing graphics show, choose color set 2, "Pastels."

One of *Graphwriter*'s unique features is that you can change any of the preset style characteristics. If you think, for instance, that texturing a slice of a pie chart would enhance its message, you can do that. You can

IS YOUR HEALTH WORTH \$145⁰⁰

... Don't Take Your Most Precious Asset,
Your Health, for Granted. ...

*Positive
LIFESTYLING™*

Helps You Take Charge Of Your World

COMPREHENSIVE

- Covers the key aspects of well being

- Exercise
- Nutrition
- Stress Management
- Chemical Dependency Control

- Sets goals for eleven factors including weight control
- Tracks an entire family's progress for up to four years

PERSONALIZED

- Provides an interesting & motivating review of your lifestyle
- Gives clear, immediate feedback
- Provides unique, personalized recommendations that guide you towards healthy patterns of living

EFFECTIVE

- Promotes well being by building awareness and self esteem
- Presents data in a clear manner without being simplistic

RESEARCH

- Positive Lifestyling uses concepts developed from extensive research by health experts

EXCITING

- Positive Lifestyling features a full range of exciting graphics and color
- Positive Lifestyling makes improved well being fun, not a chore

EASY TO UNDERSTAND

- Positive Lifestyling can be operated easily by computer novices
- The unique tracking system is stimulating and easy to follow

ACT NOW

- Send \$7 for a demo, or \$145 for the Positive Lifestyling Program. Add \$5 for shipping & handling
- Positive Lifestyling is designed for the IBM PC and compatibles.
- Mastercard & Visa welcome
- Contact: Softworld Inc., 9550 Black Mountain Road, Suite G, San Diego, CA 92126 (619) 578-4878

*Positive
LIFESTYLING™*

Circle 710 on reader service card

also highlight or underline a block of text and add a bullet or a footnote. Pies can be rotated, bars expanded, and legends relocated. The possibilities are almost infinite.

One of the pitfalls of *Graphwriter* is that it is written in compiled Pascal. Programs such as the one you generate to produce a piece of graphic art must be translated into machine language before you can view the image. With *Graphwriter* this process takes a minimum of 5 minutes. Granted, we are all in need of an occasional 5-minute break, but the process becomes tedious when after every little change you make to your program (such as changing a background color), the program must be recompiled. Waiting for the compiler to translate an entire program again and again can lead to bad work habits (and coffee addiction). The manufacturers are considering the release of an MS-DOS version of *Graphwriter*, which will eliminate this problem and minimize the inevitable terminal ennui suffered while waiting for this program to finally click the shutter.

The Polaroid Palette is not as fast as the regular instant Land camera. Using the Palette, like using most new pieces of photographic equipment, takes a little ambition and a lot of getting used to. If you're still looking for something simple in a graphics camera, an inexpensive alternative remains: a darkened room, a vintage Nikon, and you, the human, in complete control. ●

Cindy Hamburger is the Editorial Manager of PC World.

Polaroid Palette
Polaroid Corporation
 575 Technology Square 2M
 Cambridge, MA 02139
 800/225-1618
List price: \$1499
Requirements: 128K, serial port,
color graphics board with composite output

Graphwriter 3.2
Graphic Communications, Inc.
 200 Fifth Ave.
 Waltham, MA 02254
 617/890-8778
List price: \$595
Requirements: 128K, serial port,
color graphics board

4-Point Graphics 1.0
Imsi Software Publishers
 633 Fifth Ave.
 San Rafael, CA 94901
 415/454-7101
List price: \$195
Requirements: 128K, color graphics board

VideoSlide 35
Lang Systems, Inc.
 1010 O'Brien Dr.
 Menlo Park, CA 94025
 415/328-5555
List price: \$3099
Requirements: serial port, color graphics board, color monitor

Eastman Kodak Co.
Motion Picture and Audio-Visual Division
 Dept. 412L
 343 State St.
 Rochester, NY 14651
 716/724-2247
List price: \$190
Requirements: color monitor

**Price and Technical Support
 Make the Difference**



Join the Team that has Both!

COMPUTERS:

Columbia MPC Computer	} Call and \$AVE
Columbia VP Portable	
Corona Computer Systems	
Eagle Computers	

PRINTERS:

Dot Matrix:	
Delta 10	\$465.00
Epson FX-80	\$525.00
Epson FX-100 IN STOCK	\$699.00
Epson RX-80	\$514.00
Epson RX-80 FT	\$705.00
Gemini 10X	\$269.95
Gemini 15X	\$399.00
Okidata 92	\$429.00
Okidata 93	\$729.00
Prowriter I	\$339.00
Star STX-80	\$139.95
Letter Quality:	
Daisywriter 2000 w/48K	\$989.95
NEC 2000 Series	\$ CALL
Toshiba 1351	\$ CALL

MONITORS:

Amdek 300 Amber	\$129.00
Amdek 300 Green	\$149.00
Amdek Color I Plus	\$299.00
Princeton Color Graphics	\$479.00

MODEMS:

Hayes 300	\$195.00
Hayes 1200	\$469.00
Hayes 1200B	\$435.00
Signalman Mark I	\$ 75.00
Signalman Mark 12(300/1200)	\$259.00

DISKETTES:

Elephant DS/DD	\$ 24.95
Maxwell MD-2	\$32.95
Verbatim DS/DD	\$ 34.95

write for free catalog

TEAM COMPUTER PRODUCTS

109 Church Street
 New Haven, CT 06510

National Order Desk:
 1-800-343-2325
 Technical Questions and CT Residents:
 (203) 785-1606

Circle 705 on reader service card



Byte Size for Every Appetite.

Fixed and removable hard disk subsystems with 6 to 120 MB formatted capacities. And they're available now.

We satisfy a market hungry for a variety of disk subsystems.

We're Santa Clara Systems. And we offer an appealing menu of Winchester-based disks in 5 1/4", 3.9", & 8" sizes featuring integrated backup. And for IBM and Compaq users, we offer a line of internal drives.

You'll find each and every disk easily integrates into your system, and our software lets you select your own choice of volume sizes.

You'll also appreciate our Quick Disc. This is an external add-on memory device for your IBM PC. Our Quick Disc delivers exceptional speed in both data access and transfer. And used in combination with a floppy or Winchester drive, it serves as a disk cache.

However, there's more to our line of hard disks. To boost your processing speeds, our systems are designed with their own microprocessor which allows your personal computer to operate independently, therefore quicker. You'll also find a sophisticated controller that actually corrects errors without requiring host computer processing time (we knew you'd like that).

There's also a lot of reliability built into our hard disks. In fact, we think you'll find our warranty second to none. We'll give you a 6 month warranty with

optional extended coverage for up to three years.

Our complete disk package includes backup, controller, power supply, host adapter, operating software, user friendly manual and instruction cassette, cable, cabinet, and shared-disk networking options.

It's all right here. Hard disk subsystems that are soft on your budget. A complete line of disk subsystems for your Apples, IBMs and COMPAQs that are made to order and ready to go. All you have to do is pick up the phone and let us know how many bytes you'd like.

Canadian Distributor: Compuserve/
1675 West Eighth Avenue Suite 219
Vancouver British Columbia BC V6J 1V2



**Santa
Clara
Systems, Inc.**

1860 Hartog Dr., San Jose, CA 95131
(408) 287-4640/Telex: 176309 SCS SNJ



LIFEBOATTM Associates:
The full support software
source.

Reach for the programming horizon of the 80's with Lattice C, the fastest C compiler.

Set the course of your next software project towards greater power and portability by selecting Lattice C, recognized as the finest and fastest 16-bit C compiler. Lattice C, the full implementation of Kernighan and Ritchie, continues to lead the way by announcing full memory management up to 1 Megabyte. Major software houses including Microsoft, MicroPro and Sorcim are using Lattice C to develop their programs.

Lattice C is available for a wide variety of 16-bit personal computers including IBM, NCR, Texas Instruments, Victor, Wang and other microcomputers running PC[™], DOS, MS[™], DOS and CP/M86[™].

Call LIFEBOAT at 212-860-0300 for free information on the Lattice C family of software development tools.

LIFEBOAT
Associates

Lifeboat offers Lattice C with a tested set of software tools to provide a complete development system including:

HALO[™]
PANEL[™]
PMATE[™]

PLINK[™]-86

C-FOOD SMORGASBORD[™]

LATTICE WINDOW[™]

FLOAT87[™]

Circle 92 on reader service card

Color graphic primitives
Screen design aid
Customizable program editor
Overlay linkage editor
Screen and I/O utilities
Multi-window functions
8087 floating point math

LIFEBOAT
Associates

1651 Third Avenue
New York, NY 10028
212-860-0300

Please send me free information on:

- ☐ Lattice and development tools
- ☐ How to get your software published
- ☐ Corporate purchase program
- ☐ Dealer program
- ☐ OEM agreements

- ☐ Send me the complete LIFEBOAT software catalog. \$3.00 enclosed for postage and handling.

LATTICE, C-FOOD SMORGASBORD and
LATTICE WINDOW, TM Lattice, Inc.

Name

Company

Address

City

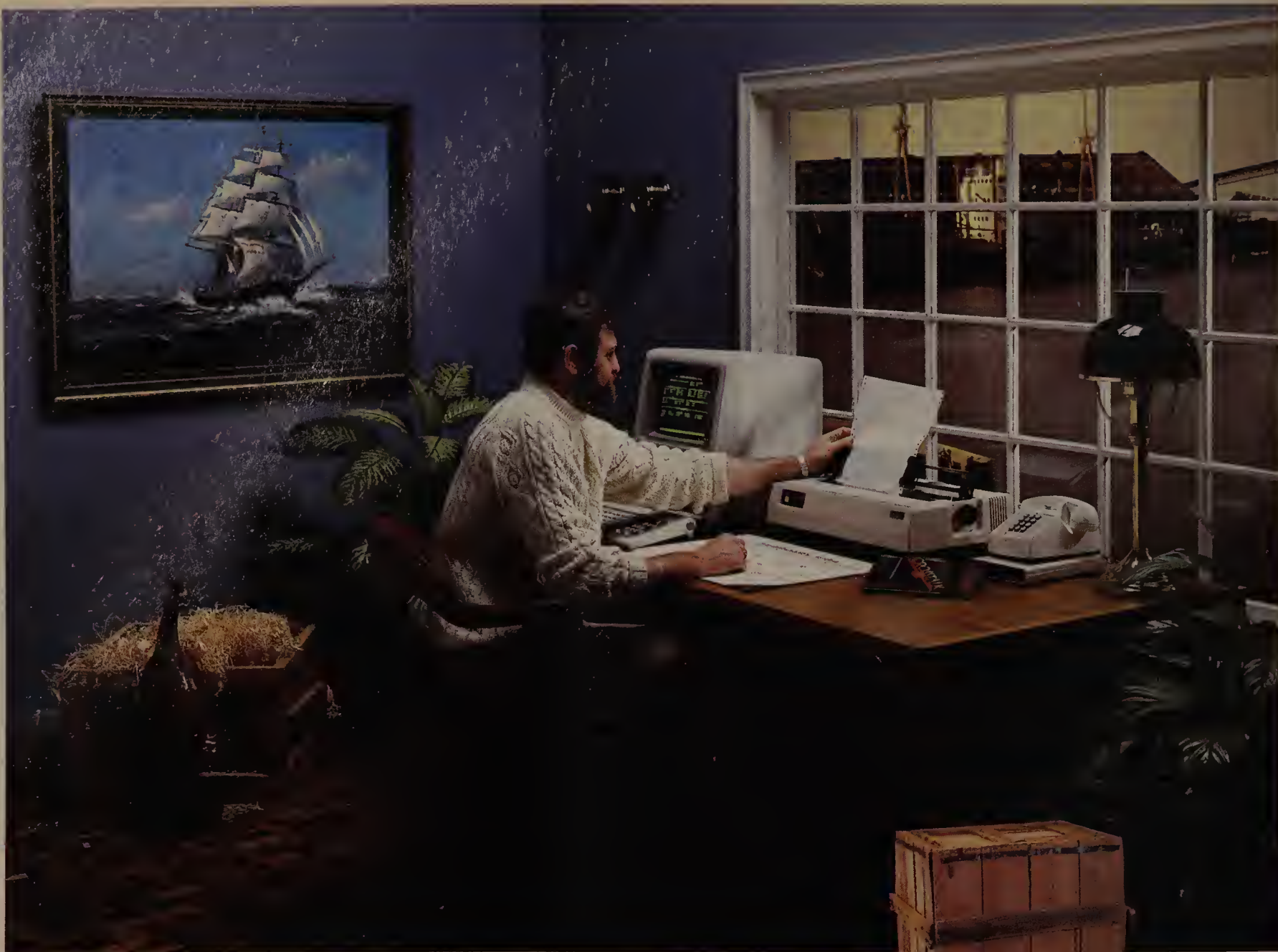
State

Zip

Telephone

LIFEBOAT, TM Lifeboat Associates
HALO, TM Media Cybernetics
PANEL, TM Roundhill Computer, Ltd
PMATE and PLINK, TM Phoenix Software

FLOAT87, TM Microfloat
IBM and PC, [®] TM International Business Machines
MS, TM Microsoft
CP/M86, TM Digital Research



International Connections

With the industry's most popular data communications program, the world is at your command.

An import/export office in New Jersey can instantly check the London market for current dollar exchange rates ... send Hong Kong an updated production schedule ... print-out the week's sales results from the Dallas branch.

There's virtually no limit to how far you can reach with your microcomputer, ordinary telephone lines, and CROSSTALK.

Even if your own business and personal needs are closer to home, you'll appreciate CROSSTALK's compatibility with a wide user base ... smart terminal characteristics ... total modem control ... and the ability to capture data at a high speed for later off-line editing. CROSSTALK has extras you may not find in other programs. Data capture to memory buffer (and on-line display). Protocol error-checking file transfer. Modem/telephone hangup, and display of elapsed time of call. Command file power and flexibility. Remote takeover and operation. And much more.

There is a CROSSTALK version for almost every CP/M, CP/M-86, or IBM DOS based microcomputer system. See your dealer, or write for a brochure.



CROSSTALK

MICROSTUF®

1845 The Exchange / Atlanta, Georgia 30339 / (404) 952-0267

CROSSTALK is a trademark of Microstuf, Inc., CP/M and CP/M-86 are trademarks of Digital Research, Inc., IBM is a trademark of International Business Machines, Inc.

Circle 275 on reader service card

1-2-3 Graphics Made Easy

If you don't know 1-2-3's graphics capabilities, you don't know 1-2-3. Here's a graphics tutorial to introduce you.

Joseph P. Celentano

The Lotus 1-2-3 graphics package is a powerful tool—and easy to use once you have struggled through a few applications. This tutorial will take you through the steps needed to create, view, and print a simple bar chart—one of several types of graphs 1-2-3 is capable of producing. (1-2-3 can also create stacked bar, line, X/Y, and pie graphs.) The graph you will create is based on sales figures for a hypothetical company called Systems Design Consultants (SDC). This exercise should acquaint you with enough of 1-2-3's graph functions to allow you to create graphs of your own.

This tutorial assumes that you are familiar with the overall 1-2-3 command structure and that you know how to move around a worksheet. The terms listed in *italics* represent 1-2-3 commands that you perform. They can be entered easily by typing the first letter of each command word, or you can use the pointer to select the appropriate command. Material in monofont represents text and values to be entered into cells or in response to prompts. To use 1-2-3's graph function as described in this article, you must have version 1A of 1-2-3, and your PC must be equipped with a graphics board, 192K of RAM, and a graphics printer.

Building the Worksheet

Before you can create a graph, you must construct a worksheet containing the data to be graphed. Start with a clean worksheet (if necessary, give the command */Worksheet Erase Yes*) and create a worksheet identical to the one in Figure 1. In cell C2 enter

1-2-3 can graph up to
six sets of data at once.

the label ^SDC CORPORATION SALES RECORD. In cell C3 enter the label ^JAN 1, 1983 - JUN 30, 1983. (The caret is added before a label to center it.) Enter the column headings shown in the figure into columns A through F of row 5, again using the caret to center the headings in the cells. To underscore the headings and to mark the boundaries of the columns, enter a row of eight hyphens in cell A6, prefaced by a single quotation mark to indicate to 1-2-3 that the entry is a label and not a mathematical operator. Use the command */Copy* <Enter> B6..F6 <Enter> to copy the row of hyphens into each column in the row.

Enter the sample data shown in Figure 1 into columns A through F. In column G enter the month labels

for each row, centering them with carets. Once the worksheet is complete, save the file to disk under the name SALESREC by giving the command */File Save SALESREC* <Enter>. You are now ready to create a graph of this information.

Creating and Viewing the Graph

The worksheet that has been created should remain on the screen after you save it. To access the functions that graph the data in the worksheet, give the command */Graph*. The Graph main menu is displayed in the control panel. From this menu you can assign attributes, or "settings," to the graph. After each setting is made, this menu will be displayed again.

To tell 1-2-3 that you want to create a bar graph, give the command *Type Bar*. The next item in the Graph menu, X, allows you to specify labels for the X-axis (horizontal axis) of the graph. For the SDC graph we'll use the month names in column G of the worksheet. To specify this range of information, give the command X G7..G12. (An alternative method of specifying ranges in 1-2-3 is to position the pointer at the first cell in the range that you want to specify, anchor the location by pressing the period key, and move the pointer to the last cell in the range. When the area

A1:								READY
	A	B	C	D	E	F	G	H
1								
2			SDC CORPORATION SALES RECORD					
3			JAN 1, 1983 - JUN 30, 1983					
4								
5	NY	SF	BOSTON	LA	PHIL	ATL		
6	----	----	----	----	----	----		
7	10000	14000	7000	18000	6000	11000	JAN	
8	11000	13000	9000	14000	9000	8000	FEB	
9	16000	11000	12000	13000	10000	9000	MAR	
10	17000	12000	13000	10000	13000	11000	APR	
11	18000	14000	12000	7000	13000	12000	MAY	
12	21000	16000	16000	11000	12000	15000	JUN	
13								
14								
15								
16								
17								
18								
19								
20								

Figure 1: The SDC worksheet

you want to specify is entirely highlighted, press <Enter>.) After you specify the range, the Graph main menu will be displayed again.

1-2-3 can graph up to six sets of data at once; you need only specify the range in the worksheet that contains each set of data, or the "data range." In this graph the sales figures for each city will be a separate data range. The items A through F in the Graph main menu allow you to specify what information will be used for data ranges A through F. To specify the data ranges give the commands

A A7..A12
B B7..B12
C C7..C12
D D7..D12
E E7..E12
F F7..F12

The last setting you must specify determines how the graph will be drawn, in color or in black and white; to do this you must use the Options command in the Graph main menu. If you have a composite

or black-and-white graphics monitor, select *Options B&W Quit*; for a color graphics monitor give the command *Options Color Quit*. The Quit command returns you to the Graph main menu.

Now that the attributes of the graph are defined, you can view the results. In the Graph main menu select *View* to display the results (in the Ready mode you can press <F10>). A graph like the one shown in Figure 2 should be displayed.

Legends and Titles

The bar graph you have just created describes the data by month and sales volume only. With the Options menu you can flesh out the graph with legends, titles, and other descriptions. Press any key to return to the Graph main menu.

Each data range on the graph is shown by a unique cross-hatching (on a black-and-white monitor) or color (on a color monitor), but someone looking at the graph could not tell what each bar represents. To add this information, give the command

Options Legend A. A prompt appears in the control panel asking for the legend of the first data range (range A). Type NY. Identify each data range with its label on the worksheet (the name of the city for which it depicts sales) using the following commands:

Legend B SF <Enter>
Legend C BOSTON <Enter>
Legend D LA <Enter>
Legend E PHIL <Enter>
Legend F ATL <Enter>

The Legend command must be given each time, since 1-2-3 returns you to the Graph main menu after each command is given. Selecting *Quit View* displays the graph with the added legends, which appear beneath the graph border.

1-2-3 permits four types of titles. The First title is positioned at the top of the page outside of the graph's borders. The Second title is inserted just below the First. The X-Axis and Y-Axis titles are located next to the appropriate axes.

From the Graph main menu give the command *Options Titles First Systems Design Consultants* <Enter>. Add the other titles with the following commands:

Titles Second Six-Month Sales History
<Enter>

Titles X-Axis Month <Enter>

Titles Y-Axis Dollars <Enter>

Then select *Quit* to return to the Graph main menu and *View* to display the graph with the titles you just added.

Scale Formats

For most graph types you can choose the scale in which the graph should be drawn. 1-2-3 will automatically choose a graph scale appropriate for the data. (We've used automatic scaling for the SDC graph in Figure 2.) But for special effects you can choose your own scale. For instance, to impress upon an audience of salespeople how much room there is for growth, you could set a much larger scale for the Y-axis, leaving the sales bars cowering near the bottom of the graph.

For bar graphs only the Y-axis is numeric, so you will need to choose a scale for that axis only. The command *Options Scale* produces a menu with Y-Scale, X-Scale, and Skip options. (The Skip command tells 1-2-3 to graph every other data entry, such as A1, A3, A5, and A7.) To set the scale for the Y-axis, give the command *Y-Scale Manual Upper 60000* <Enter>. 1-2-3 will use 0 for the scale's lower limit unless another number is specified.

1-2-3 also allows you to choose from several formats for the data displayed in each axis of the graph. You can choose from Fixed Scientific, Currency, General, +/–, Percent, Date, and Text. The graph data is in sales dollars, so the format of the Y-axis scale should be set to show currency (\$). Since you've just set the scale for

the Y-axis, the control panel still displays the options for the Y-Scale. Select *Format Currency*. A prompt appears requesting the number of decimal places to display. (The default is 2.) Type 0 <Enter>. Then select *Quit Quit* to return to the Graph main menu.

With the Options menu you can flesh out the graph with legends, titles, and other descriptions.

Use the *View* command to look at the completed graph with the bars scaled small enough to inspire the sales force. The displayed graph should be similar to the one in Figure 3. Then press any key to return to the Graph main menu.

Saving the Graph

To save the settings you have chosen, you must give the graph a name; in this case we'll use SDC. To name the graph, give the command *Name Create SDC* <Enter> from the Graph main menu. The graph is saved as part of the worksheet file (SALES-REC.WKS). Anytime you want to view the graph, you can call up the worksheet file and press <F10>. You can save several different graphs based on the same data in the worksheet file by giving each graph a different name. For instance, you could also store a pie chart based on the sales figures you've typed in the worksheet.

The building of the worksheet and the creating of the graph are now complete. Since the graph is named, it will always exist in the worksheet file. To manipulate or view the graph at

any time after you have named it with the Name Create command, you must give the Name Use command from the Graph main menu to make the graph "current." Once the graph is current, you can change the graph type, the data ranges, the legends, and the other settings.

Before you go any further, you should save the worksheet file that contains the graph. To do this, return to the main menu (with the command *Quit*) and then use the command */File Save SALESREC* <Enter> *Replace*.

Printing the Graph

Although a graph can be viewed and manipulated in a worksheet file, it cannot be printed. To print it you must save it in a graph file (to which 1-2-3 automatically assigns the file extension .PIC). Since the graph was just saved with the worksheet, you must recall it again, or make it "current." To do this from the Graph main menu, give the command *Name Use SDC* <Enter>. After you give the command, the Graph main menu will be displayed again.

To save the graph in a "picture" file, give the command *Save SDC* <Enter> from the Graph main menu; this creates the graph file SDC.PIC on the disk. To print the graph, you will access this new file. Leave 1-2-3 and start up the 1-2-3 PrintGraph program. Give the command *Quit Quit Yes*. The screen displays the Lotus Access System. If you are working with floppy disk drives, you must insert the special PrintGraph disk in drive A: before you continue. Then select *PrintGraph* from the menu. The PrintGraph menu that appears lets you control several attributes of the graph, including options for the font, the position of the graph on the page, and the size of the printed graph.

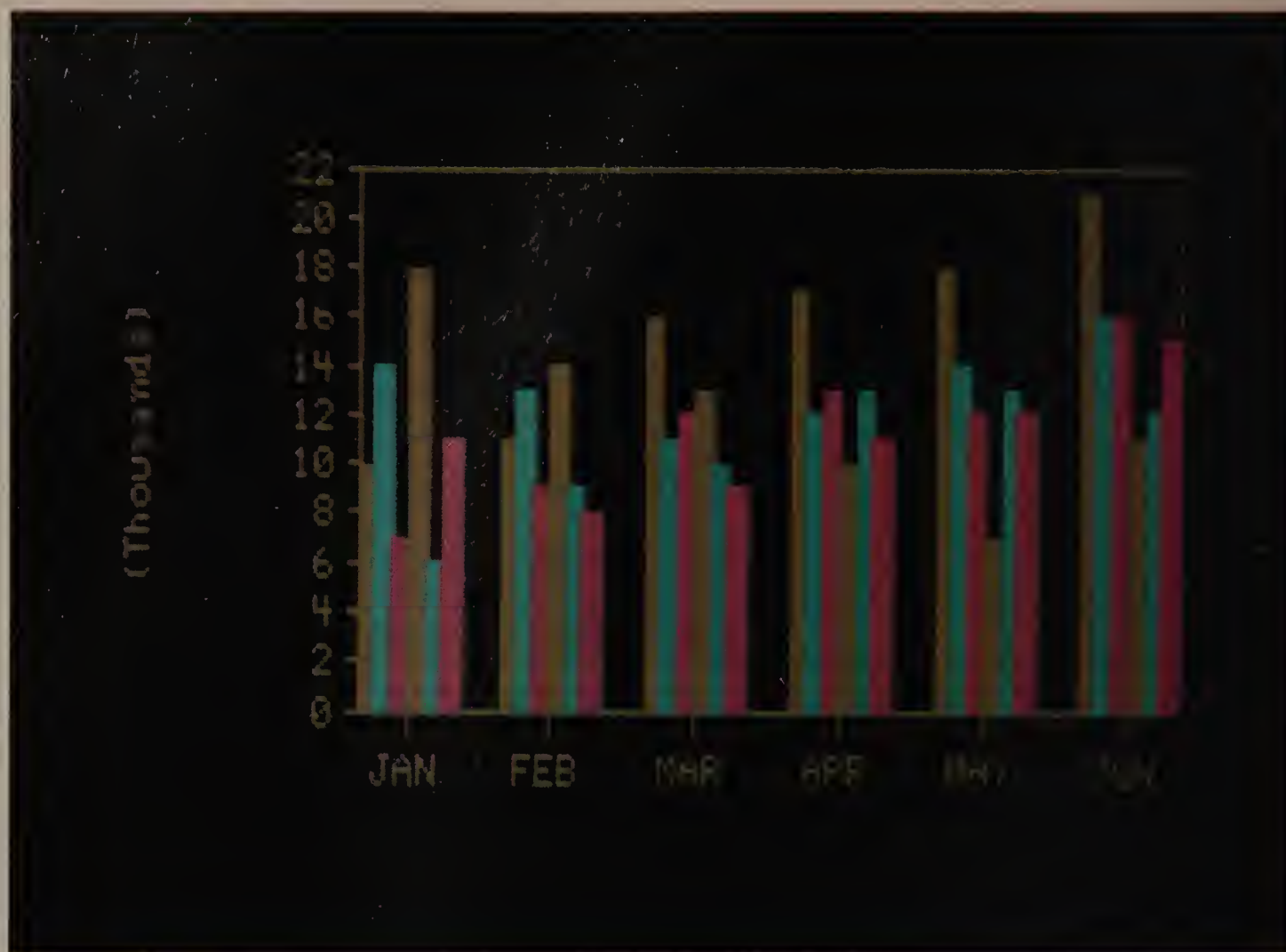


Figure 2: The SDC graph with preliminary settings assigned



Figure 3: The finished graph

You can use two different fonts in a graph; the first is used for the first graph title, and the second is used for the rest of the graph. (If you do not choose a second font, the first font you select will be used for the entire graph.) Specify the first typeface you want by using the command *Options Font 1*. The screen displays a list of the type styles available for the graph. The names of the fonts are followed by a 1 or a 2. A 1 following the font name means that the font is the regular (light) face of that type style. A 2 following the name means that the option is the boldface version of the font. Select the font you want by using the <Space> bar or the cursor control keys to highlight your choice, and then press <Enter>. To select the second font, give the command *Font 2* and select from the menu in the same way.

After you select the fonts, the control panel returns to the Options menu. (Notice that the status screen, below the Options menu, is updated to show your new selections.) From the Options menu select the graph size with the command *Size Full*. This tells the program to size the graph for a full sheet of 8½- by 11-inch paper. Selecting *Half* would print the graph on half of an 8½- by 11-inch page. The *Manual* command allows you to choose your own values for the length and width of the graph, the size of the graph's margins, and the rotation of the graph on the page. After you specify the graph size, return to the PrintGraph main menu by giving the command *Quit Quit*.

Ready to Print

Unless your hardware conforms to the default specifications in PrintGraph, you will need to set the drive, device, interface, and page size options with the *Configure* command.

PrintGraph assumes that you are using an Epson FX-80/1 printer, that the picture file is in drive B:, that the Font file (on the PrintGraph disk) is in drive A:, and that you want to print on 8- by 11-inch paper (the Epson's default).

If the graph file is not in drive B:, you must specify its drive location by using the *Configure Files Pictures* command. When you are prompted to do so, enter the name of the drive

To save the settings
you have chosen, you
must give the graph a
name.

that contains the picture file. Then give the *Quit* command. These commands tell the program that the picture file (graph) is in the disk drive you specify, and then they return you to the *Configure* menu.

To tell the program what kind of printer you are using, give the *Device* command. A list of printers and plotters that the program supports will be displayed. Use the <Space> bar or cursor control keys to move the pointer to the desired printer and press <Enter>. Back at the *Configure* menu, select *Interface* and indicate the computer port to which the printer is attached. After you have selected the interface, the program returns to the *Configure* menu.

The other two items in the menu, *Save* and *Reset*, are used later to save and change new configurations. Return to the PrintGraph main menu using *Quit* and then give the *Select* command. A menu displays the name of the graph and gives directions for selecting that graph for printing. With the graph name (SDC.PIC) highlighted, press <Enter>. You will be returned to the PrintGraph menu.

You are now ready to print the graph. Turn on your printer and select *Go* from the PrintGraph menu, and printing will start.

Variations

This article gives only one example of 1-2-3's graphics capabilities, but once you learn the basic process of defining settings for the graphs and using the PrintGraph options, you should be able to use 1-2-3's other graphics features. To make a pie chart or a stacked bar graph, you use many of the same commands that you used to create this sample bar chart.

Once you have created and named a graph, you can visually explore the ramifications of changes in the underlying data. After you revise the worksheet, the <F10> Graph command will quickly display the graph based on the new data, using the settings you've already chosen. You can also experiment with different ways of presenting the same data—to determine, for instance, whether a pie chart gives a clearer picture than a stacked bar graph or whether an effect you want can be achieved by lengthening a scale or using different data ranges. Your reports will never be the same. ●

Joseph P. Celentano is a 1-2-3 instructor and applications specialist for Bechtel Power Corporation in San Francisco.

1-2-3, version 1A

Lotus Development Corp.

161 First St.

Cambridge, MA 02142

617/492-7171

List price: \$495

Requirements: 192K, two disk drives;
for graphics, color graphics board

In Software we're the *logical* choice!

**LOWEST
PRICE
GUARANTEE**

WE'LL BEAT ANY PRICE
BY \$ **10** AND THANK YOU
FOR THE PRIVILEGE

**WE GUARANTEE
48 HOUR
SHIPPING**

WE'LL SHIP YOUR ORDER
WITHIN 48 HOURS or HAVE
a BOX of DISKETTES on us.

THIS OFFER APPLIES TO PHONE ORDERS FOR OUR ADVERTISED ITEMS ONLY
AND WILL BE SHIPPED WITH YOUR ORDER.

**TOLL-FREE
SUPPORT**

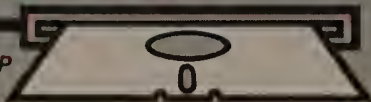
LOGICSOFT OFFERS TOLL-FREE, UNLIMITED
TECHNICAL SUPPORT FOR ALL OUR CLIENTS

1-800-645-3491
516-741-0043(N.Y.S.)

LOGICSOFT

A MEMBER OF THE LOGIC GROUP

LOGICSOFT is a Reg. T.M. of Logisoft, Inc.



Continental U.S.

1-800-645-3491

300 Garden City Plaza,
Garden City, New York 11530

New York State 516-741-0043
Canada 416-283-2354
Int'l. Telex ... 230199 Swift UR LGS
Dom. Telex . 960127 Swift NYK LGS



NO SURCHARGE FOR CREDIT CARDS
Purchase orders accepted by qualified institutions

Add 2% for shipping and handling ☐ COD ☐ Check ☐ Money Order ☐ NYS residents add sales tax



TEAR and COMPARE

Use this card to Shop the magazines

SEE REVERSE SIDE FOR ACCOUNTING SYSTEMS



LOWEST PRICE GUARANTEE

WE'LL BEAT
ANY PRICE
BY \$ **10** AND
THANK YOU
FOR THE
PRIVILEGE

Tell us the advertiser and price for any IBM-PC software package advertised in a current issue of any popular computer publication and we'll beat that price by \$10. This offer does not apply to those packages whose advertised price is under \$100 or where LOGICSOFT's price is already the lowest!

WE
OFFER
OVER
400
OTHER
TITLES

Prices subject to change without notice

LANGUAGES/COMPILERS

Lattice C Compiler (Lifeboat)	\$325
Concurrent CP/M86 (Digital Research)	\$205
Pascal MT+ (Digital Research)	\$235
C Compiler (Digital Research)	(lowest price)
PL/1 (Digital Research)	\$479
Access Manager (Digital Research)	\$269
Display Manager (Digital Research)	\$359
CIS Cobol 86 (Digital Research)	\$479
Pascal Compiler (Microsoft)	\$245
C Compiler (Microsoft)	\$325
Basic Compiler (Microsoft)	\$245
Cobol Compiler (Microsoft)	\$459
Business Basic (Microsoft)	\$369
Fortran Compiler (Microsoft)	\$245
RM/Cobol (Ryan McFarland)	\$695

WORD PROCESSING

Multimate	\$275
Microsoft Word without Mouse	\$239
Microsoft Word with Mouse	\$295
Wordperfect	\$319
WORDSTAR	\$235
Peachtext 5000	\$195
Wordplus-PC	\$285
Volkswriter Deluxe	\$175
Edix & Wordix	\$255
Easywriter II/Speller/Mailer	\$195
Finalword	\$189
Think Tank	\$159

SPREADSHEETS/GRAPHICS

Multiplan	\$155
Supercalc ³	\$239
Visicalc IV	\$159
TK! Solver	\$285
LOTUS 1-2-3	\$309
Context MBA	\$489
T/Maker III	\$199
Open Access	\$389
Jack 2	\$359
Super Chartman II & IV	\$349
BPS Graphics	\$289
Fast Graphs	\$185

DATA BASE/FINANCIAL

Quickcode	\$169
Knowledgeman	\$275
TIM IV	\$269
R:Base 4000 (Microrim)	\$325
dBASE II	\$375
Condor III	\$359
Friday	\$175
Data Base Manager II (Alpha)	\$165
Infostar	\$255
Dow Jones	(lowest price)
Financier II	\$115
Dollars & Sense	\$105

CLIP AND SAVE OUR CARD FOR YOUR FILE



NO SURCHARGE FOR CREDIT CARDS

Purchase orders accepted by qualified institutions.

Add 2% for shipping and handling ☐ COD ☐ Check ☐ Money Order

☐ NYS residents add sales tax

1-800-645-3491

New York State 516-741-0043
Canada 416-283-2354

Int'l. Telex ... 230199 Swift UR LGS
Dom. Telex . 960127 Swift NYK LGS



300 Garden City Plaza, Garden City, NY 11530

Continental U.S.

1-800-645-3491

New York State 516-741-0043
Canada 416-283-2354
Int'l. Telex ... 230199 Swift UR LGS
Dom. Telex . 960127 Swift NYK LGS

LOGICSOFT is a Reg. T.M. of Logicsoft, Inc.

TEAR AND SAVE

Looking for an Accounting System?

CALL US...

WE'VE EVALUATED OVER 50 OF THEM

See our ad in *Journal of Accountancy*



INFORMATION UNLIMITED SOFTWARE (IUS)

general ledger	\$295
accounts payable	295
accounts receivable	295
payroll	375
inventory	295
order entry	295
financial series (G/L, A/P, A/R)	859

STATE OF THE ART

general ledger	\$479
accounts payable	479
accounts receivable	479
payroll	479
inventory	399
sales invoicing	399
time keeping and billing	679

PEACHTREE SERIES 8

general ledger	\$375
accounts payable	375
accounts receivable	375
payroll	375
inventory	375
sales invoicing	375
job costing	375

SOLOMON SERIES III

general ledger (client writeup)	\$479
accounts payable	479
accounts receivable	479
payroll	479
inventory	479
order entry/invoicing	479
purchasing	479
job costing	799

GREAT PLAINS SOFTWARE

general ledger	\$479
accounts payable	479
accounts receivable	479
payroll	479
inventory	479

MBSI (Realworld)

general ledger	\$575
accounts payable	575
accounts receivable	575
payroll	575
order entry/inventory	575
sales analysis	289

OPEN SYSTEMS

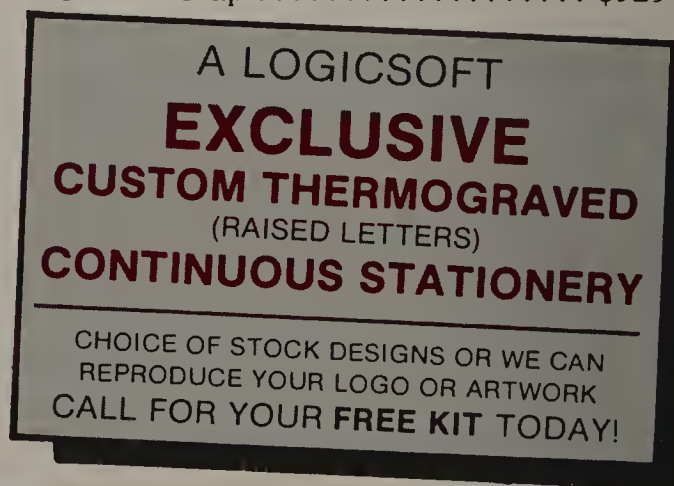
general ledger	\$559
accounts payable	559
accounts receivable	559
payroll	559
inventory	559
sales order processing	559
purchase order processing	559
job costing	559

THE BUSINESS LIBRARIES

general ledger	\$459
accounts payable	459
accounts receivable	459
payroll	459
inventory control	549
sales order entry	549
purchase order tracking	549
profit planner	549
the librarian	149

TCS

client write up	\$929
-----------------	-------



We're known by the companies we keep

- | | |
|-----------------------|---------------------------------|
| ■ ASHTON - TATE | ■ MICRORIM |
| ■ DIGITAL RESEARCH | ■ MICROSOFT |
| ■ DOW JONES | ■ PEACHTREE |
| ■ INNOVATIVE SOFTWARE | ■ SATELLITE SOFTWARE |
| ■ IUS | ■ SOFTWARE ARTS |
| ■ FOX and GELLER | ■ SOFTWORD SYSTEMS |
| ■ LIFETREE | ■ SORCIM |
| ■ LOTUS | ■ AND OVER 100 OTHER PUBLISHERS |

- the Logical Choice!



LOGICSOFT is a Reg. T.M. of Logicsoft, Inc.

NO SURCHARGE FOR CREDIT CARDS

Continental U.S.

1-800-645-3491

300 Garden City Plaza, Garden City, NY 11530



New York State 516-741-0043
 Canada 416-283-2354
 Int'l. Telex . . . 230199 Swift UR LGS
 Dom. Telex . . . 960127 Swift NYK LGS

Tired of waiting for your PC?



End the wait!... DOUBLEDOS ~~DON'T DO2~~

No matter how good your IBM PC is, you still have to wait while it processes and calculates for a long report, spread sheet, payroll, or whatever. This waiting is costing you time and money.

Now, DoubleDOS, the remarkable new software, lets your IBM PC actually run programs concurrently!

Think of the ways DoubleDOS will save you time and money:

- **BUSINESS.** Run a spreadsheet, and at the same time, print the payroll checks or accounting reports.
 - **WORD PROCESSING.** Work on another document while printing or spell checking previous work.
 - **PROGRAMMING.** Compile programs while starting new ones immediately.
 - **COMMUNICATIONS.** Receive or send information while you use the PC to do other tasks.
- DoubleDOS has endless applications! But it's easy

to use... and requires no additional expensive hardware or software modifications.

Save the wasted time it takes for your PC to catch up with you! If you believe time saved is money earned, you're already thinking DoubleDOS.

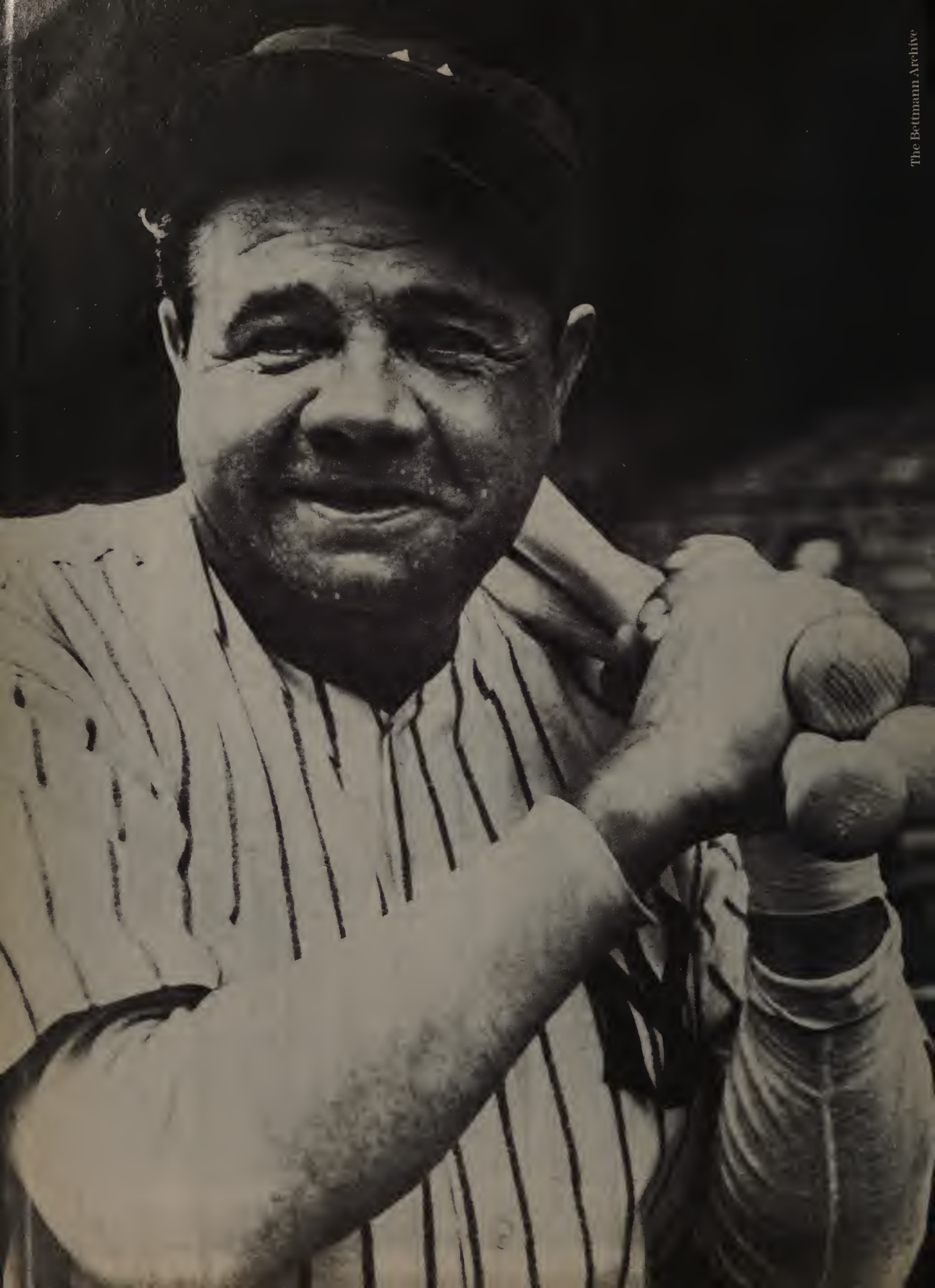
Ask for a demonstration of DoubleDOS at your local computer store. You'll see the potential. For more information on DoubleDOS and how it can put you ahead of the rest of the world, call SoftLogic Solutions at 1-800-272-9900, and we'll tell you the entire story.

DoubleDOS—takes the *wait* out of processing.
\$299.

SOFTLOGIC **SOLUTIONS**

530 Chestnut St., Manchester, NH 03101
1-800-272-9900. In NH call 627-9900.

DoubleDOS works with PC-DOS and your existing DOS software.



All he could do was hit.

And the Babe's fans loved him for it. Doing one thing very well has its rewards. Some people make history. Some set records. Some win hearts.

Multimate International. In a brief 18 months, a growing "fan club" of users has made us one of the leading software companies in the world. The object of their affection: Multimate, the program that put the power and speed of a Wang dedicated word processor into the IBM PC.

We've carved a niche in office automation. By committing ourselves to word processing. And to matching the IBM PC line, product for product. But we're also committed to extending the reach of word processing. By broadening our Multimate line to include data management, and, in the near future, a program that will allow users to convert Wang files to the Multimate format.

Multimate International. We've come a long way in a short time by being very good at what we do. We intend to keep it that way.

To find out more about Multimate, the word processor, and Multimate International, the company, call Jordan Caswell at 1-800-243-3142.

The logo for Multimate, featuring a large, stylized, italicized 'M' followed by the word 'ultimate' in a clean, sans-serif font.

We're putting our reputation into words.

. Star-Dot-Star

A global exchange of personal computer discoveries

Edited by Steven Cook

Christopher Wiley of Prescott, Arizona, advises that the BLANK.COM program for the Compaq created by the published version of his program BLANKMKR.BAS (*.*, PCW, Vol. 2, No. 4) causes the screen of his PC to go blank automatically after 27 seconds of keyboard inactivity rather than after 5 minutes. To modify the program for the PC, change the value of the checksum in line 170 to 12476 and change the third and fourth values in line 1050 to &H4A and &H15, respectively.

David Hohnadel of Cincinnati, Ohio, writes that replacement doors for Tandon disk drives are available from IBM; call 317/658-2022. The part number is 8654242, and doors cost \$3.95 each. The door pin is part number 8654262 and is priced at \$2.60. You can also get the parts at any IBM Service Exchange for an additional \$5 handling charge.

This month's column includes instructions for using DEBUG to assemble small programs, routines for controlling the <CapsLock> and <NumLock> keys from within batch files, and hints for keeping track of subroutines in BASIC and for making the function keys more functional. Finally, we have a fascinating program that reassigns the functions of the PC keyboard to a new and more efficient pattern.

Built-In Assembler

I found Richard Steck's article "Trouble in PC CTTY" [PCW, Vol. 1, No. 6] quite useful, but it seemed like a lot of overhead to use the BASIC interpreter just to output a few bytes to control the RTS and DTR signals. Until recently that was the only method available to PC owners who

didn't have an assembler. But since the release of DOS 2.00, the DEBUG command accepts assembly language statements and assembles them directly into memory. The process sounds more complicated than it actually is, and I encourage readers to

Since the release of DOS 2.00, the DEBUG command accepts assembly language statements and assembles them directly into memory.

experiment with this facility if they are curious about assembly language programming.

The statements shown in CTTYFIX (see listing) illustrate the steps needed to create a program called CTTYFIX.COM to replace Mr. Steck's program CTTYFIX.BAS. Place a disk containing a copy of the DOS 2.00 version of DEBUG.COM into drive A: and type DEBUG; the DEBUG program will display a hyphen as its prompt. Type the command A 100 to indicate that you want to assemble statements into memory beginning at hexadecimal address 100, the address where all .COM programs must begin.

DEBUG will respond to the Assemble command (A) by printing the address of the active segment followed by a colon and the current offset (100); it will then wait for you to enter an assembly language statement. (The segment number will vary depending on the configuration of your PC.) DEBUG automatically increments the offset as it assembles each line and then waits for another statement. When you are finished, press <Enter> without typing anything else, and DEBUG will return to its command mode.

After the statements have been entered, you can save them on disk. First use DEBUG's Register command to set the CX and BX registers to reflect the number of bytes to be written to disk. The BX register must be set to zero for any program less than 64K long. Set the CX register to 100 (hex) less than the last offset value (the one displayed on the line when you pressed only <Enter>). In this example the last offset was 011A, so the program length is 1A bytes.

To set the BX register to zero, type R BX and then press <Enter>. DEBUG will display a colon and allow you to enter a new value for the BX register. Type a zero and then press <Enter>. Use the same procedure to set the value of the CX register: type R CX, press <Enter>, and then type 1A <Enter> after the colon.

If you have any doubts about the length of a program, you can use DEBUG's hex calculator by typing the letter H at the hyphen prompt, followed by the last offset value, followed by 100. DEBUG responds with two values that are, respectively, the sum and the difference of the two values you typed after the letter H. The difference value is the length of your program.


```

A>DEBUG <Enter>
-A 100 <Enter>
3A35:0100 MOV AL,0B <Enter>
3A35:0102 MOV DX,03F9 <Enter>           ;use 2F9 for COM2:
3A35:0105 OUT DX,AL <Enter>
3A35:0106 MOV AL,1A <Enter>
3A35:0108 MOV DX,03FB <Enter>           ;use 2FB for COM2:
3A35:010B OUT DX,AL <Enter>
3A35:010C MOV AL,0B <Enter>
3A35:010E MOV DX,03FC <Enter>           ;use 2FC for COM2:
3A35:0111 OUT DX,AL <Enter>
3A35:0112 MOV AL,F0 <Enter>
3A35:0114 MOV DX,03FE <Enter>           ;use 2FE for COM2:
3A35:0117 OUT DX,AL <Enter>
3A35:0118 INT 20 <Enter>
3A35:011A <Enter>
-R BX <Enter>
BX 0000
:0 <Enter>
-R CX <Enter>
CX 0000
:1A <Enter>
-N A:CTTYFIX.COM <Enter>
-W <Enter>
Writing 001A bytes
-Q <Enter>
A>

```

CTTYFIX

Use DEBUG's Name command to assign a file name to the program. After the hyphen prompt, type the letter N followed by the file name—for example, N A:CTTYFIX.COM. Once a file name has been assigned, you must use the Write command to store the program on a disk. Simply type the letter W and press <Enter>. In this example, DEBUG will respond with the message 'Writing 001A bytes'; when it has finished, it will return to its command mode. To exit DEBUG, type the letter Q and press <Enter>.

I find that using DEBUG to create small programs is actually easier and faster than using the IBM Macro Assembler, and anyone who has DOS 2.00 can use this technique to "hand compile" BASIC programs that simply POKE values into memory. The commonly used statements translate as follows: 'DEF SEG = &Hxxxx' becomes 'MOV DS,xxxx'; 'POKE &Hxxxx,&Hyy' becomes 'MOV BYTE [xxxx],yy'; 'SYSTEM' becomes 'INT 20'.

*Roland Hutchinson
Stanford, California*

Editor's note: Use the technique described by Mr. Hutchinson to enter the programs in the following item.

Keyboard Control

The two programs CAPSLOCK.COM and NUMLOCK.COM in Figure 1 enable you to turn on the <CapsLock> and <NumLock> keys within a batch file prior to executing another program such as dBASE II or SuperCalc.

*Jim Anes
Brantford, Ontario*

Editor's note: The programs CAPSOFF.COM and NUMOFF.COM are the logical inverse of these programs and will turn off the <CapsLock> and <NumLock> keys.

PICK UP THE PHONE AND PICK UP A BARGAIN.

WORDSTAR
\$235

LOTUS 1-2-3
CALL

dBASE II
\$375

SUPERCALC 2
\$159

WORDSTAR
PROF. PAK
\$369

EASYWRITER II
SYSTEM
\$195

RBASE 4000
\$325

SUPERCALC 3
\$219

LOOK AT THESE INCREDIBLE PRICES.

ATI Training Power	Call	MicroSoft Products	Call	VolksWriter Deluxe	\$175
CrossTalk	\$195	MultiMate	\$279	WordStar	\$235
dBase II	\$375	PeachText 5000	\$229	WordStar Prof. Package	\$369
db Manager II	\$199	Perfect Software Products	Call	All Other Products	Call
EasyWriter II System	\$195	PlanStar	Call		
Hayes SmartModems	Call	Pro Key	\$ 95		
InfoStar	\$249	Quadram Quadboards	Call		
IUS Accounting	Call	QuickCode	\$175		
Lotus 1-2-3	Call	RBase 4000	\$325		
MailMerge	\$129	SuperCalc 2	\$159		
MicroPro Products	Call	SuperCalc 3	\$219		
MicroSoft Word	\$329	VisiCorp Products	Call		

THE ECONOMY SOFTWARE PROMISE:

We are dedicated to providing the finest software and hardware for the IBM-PC (and compatibles) at the lowest possible price. Plus the excellent service you expect and deserve. Count on us for:

- ☐ **The Lowest Prices Anywhere.** Our high volume selling makes it possible.
- ☐ **Giant Inventory.** Everything's in stock so you don't have to wait.
- ☐ **Fast Delivery.** We ship U.P.S. Blue Label, unless you specify otherwise.
- ☐ **Specialist Expertise.** Our experience makes us the IBM software experts. We can serve you better.

**WRITE: ECONOMY
SOFTWARE**
2040 Polk Street
San Francisco, CA 94109

ECONOMY SOFTWARE

We guarantee our products against manufacturer's defects.

- ☐ Quantity discounts available.
- ☐ No surcharge added for charge cards.
- ☐ Purchase orders accepted.
- ☐ Call for shipping charges.
- ☐ Prices subject to change.

WE'LL MATCH PRICES!



```
CAPSLOCK.COM
MOV DX,0040
MOV DS,DX
MOV AL,[0017]
OR AL,40
MOV [0017],AL
INT 20
```

```
NUMLOCK.COM
MOV DX,0040
MOV DS,DX
MOV AL,[0017]
OR AL,20
MOV [0017],AL
INT 20
```

```
CAPSOFF.COM
MOV DX,0040
MOV DS,DX
MOV AL,[0017]
AND AL,BF
MOV [0017],AL
INT 20
```

```
NUMOFF.COM
MOV DX,0040
MOV DS,DX
MOV AL,[0017]
OR AL,DF
MOV [0017],AL
INT 20
```

Figure 1: Assembly language programs to control the <NumLock> and <CapsLock> keys from DOS

Subroutine Locator

Locating a particular subroutine within a large BASIC program can be difficult because the BASIC editor does not have a search capability. I create a subroutine index in my programs by adding two lines similar to those shown in SUBFIND (see listing).


```

10 REM Example program
20 ON 0 GOSUB 740, 890, 1240, 1380, 1720, 1940
30 REM Input, Help, OpenFile, ReadFile, Error, Initialize

```

SUBFIND

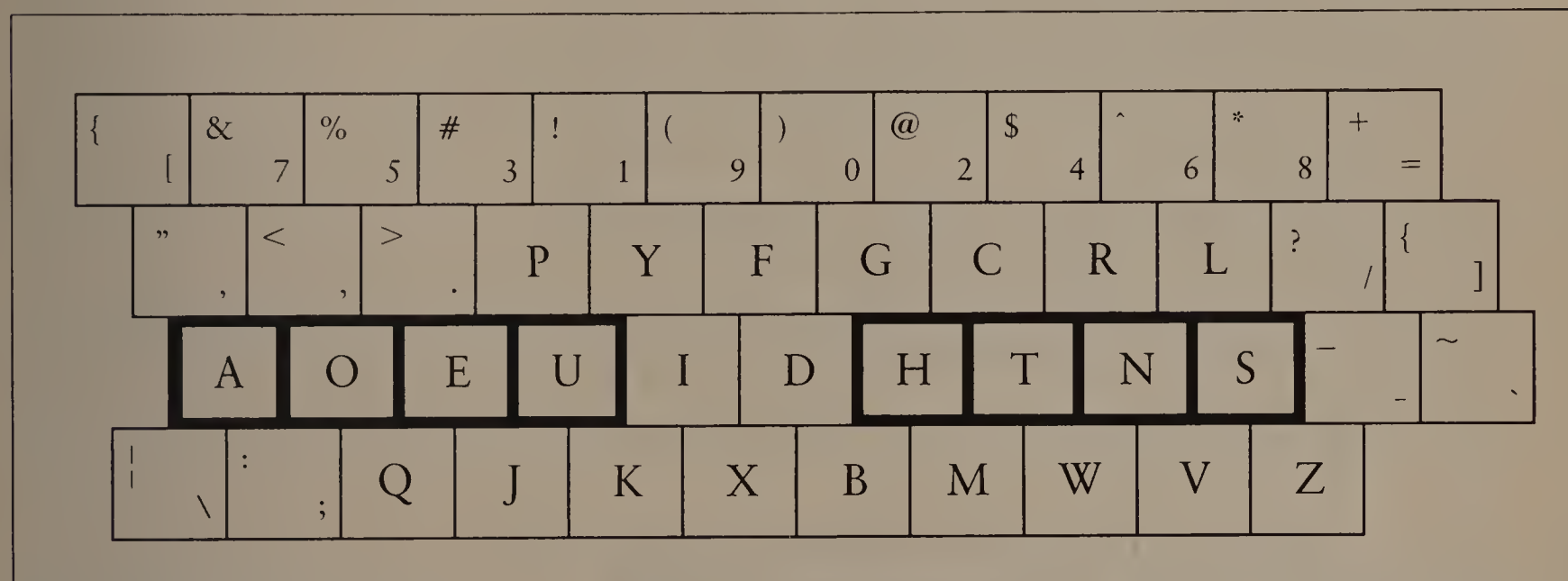


Figure 2: Dvorak keyboard layout

Because there is a zero as the argument for the ON ... GOSUB statement, no subroutine will be called, and execution falls through to the next statement. Therefore, line 20 has no effect on the execution of the program. However, when the program is renumbered, the line numbers in the ON ... GOSUB statement will be updated to reflect the new locations of the subroutines.

David E. Lupo

Moncks Corner, South Carolina

Editor's note: You may need several such lines to identify all of the subroutines in a large program.

Self-Cleaning Keys

Have you ever pressed the <F1> key to list a program only to get a 'Syntax Error' message because there were extraneous characters on the line? To prevent that problem, I redefine the function keys with an Escape character preceding the command—for example, 10 KEY 1,CHR\$(27)+"LIST ". The Escape clears the line before the rest of the command is issued.

Jerry Hartis

Knoxville, Tennessee

Editor's note: Definitions for all ten function keys can be placed into a small program that terminates with a NEW command and can be run automatically by a batch file whenever you start BASIC.

Build a Better Keyboard

When the typewriter was developed, the keys were positioned to slow down the typist, because the keys would jam if words were typed too quickly. This intentionally inefficient arrangement of keys is known as the "QWERTY" keyboard, and it appears on just about every keyboard used in the Western Hemisphere.



```
5 ' This program implements the Dvorak Simplified Keyboard
10 DEF SEG=0:FOR I=0 TO 3:V(I)=PEEK(I+88):NEXT ' Save keyboard vector
20 DEF SEG=&HC00 : OFFSET=0 : GOTO 80 ' Initialization routine
30 DEF SEG=&HC00 : DVORAK=53 : CALL DVORAK ' Switches to DSK
40 PRINT "Dvorak keyboard now activated. Type RUN 50 to deactivate.":END
50 DEF SEG=&HC00 : QWERTY=85 : CALL QWERTY ' Restores QWERTY
60 PRINT "QWERTY keyboard has been restored.":END
70 '
80 CLS:PRINT "Dvorak keyboard installation in progress..."
90 ' First, POKE the program into memory
100 FOR I=1 TO 9
110 CK=0:READ LN
120 FOR J=1 TO 12
130 READ X$:X=VAL("&H"+X$):CK=CK+X:GOSUB 330
140 NEXT
150 READ CKSUM:IF CK<>CKSUM THEN 310
160 NEXT
170 ' Next, POKE the translation table in
180 FOR I=1 TO 8
190 CK=0:READ LN
200 READ A$
210 FOR J=1 TO LEN(A$)
220 X$=MID$(A$,J,1):X=ASC(X$)
230 IF X$="~" THEN X=34 'convert to quote marks
240 CK=CK+X:GOSUB 330
250 NEXT
260 READ CKSUM:IF CK<>CKSUM THEN 310
270 NEXT
280 ' Finally, save the old keyboard interrupt vector
290 FOR I=0 TO 3:X=V(I):GOSUB 330:NEXT
300 PRINT "Installation complete. Type RUN 30 to activate.":END
310 PRINT "Data Error in data line";LN:END
320 ' The actual POKEs are done here
330 POKE OFFSET,X:OFFSET=OFFSET+1:RETURN
340 ' These lines contain the program
350 DATA 1,CD,60,53,1E,BB,4C,C0,50,3C,20,72,13,1174
360 DATA 2,3C,7C,73,0F,80,FC,54,73,0D,80,FC,37,1341
370 DATA 3,74,05,80,FC,47,72,03,58,EB,10,31,C0,1269
380 DATA 4,8E,D8,A0,17,04,24,40,75,03,BB,A8,C0,1312
390 DATA 5,58,D7,1F,5B,CF,FA,50,1E,31,C0,8E,D8,1591
400 DATA 6,A3,58,00,B8,00,0C,A3,5A,00,A1,24,C1,1090
410 DATA 7,A3,80,01,A1,26,C1,A3,82,01,1F,58,FB,1348
420 DATA 8,CB,FA,50,1E,31,C0,8E,D8,A1,24,C1,A3,1715
430 DATA 9,58,00,A1,26,C1,A3,5A,00,1F,58,FB,CB,1306
440 ' This is the translation table
450 DATA 10," { _%#!)-$^@+W8VZ6[75319",1407
460 DATA 11,"024sSw=vz&AXJE.UIDCHTNM",1752
470 DATA 12,"BRL'POYGK,QF;/\](*'axje",1745
480 DATA 13,">uidchtnmbrl~poygk<qf:?",2226
490 DATA 14," { _%#!)-$^@+w8vz6[75319",1503
500 DATA 15,"024SsW=VZ&AXJE>UIDCHTNM",1672
510 DATA 16,"BRL~POYGK<QF;/\](*'axje",1755
520 DATA 17,".uidchtnmbrl'poygk,qf:?",2200
```


As time passed, the mechanics of typewriters were improved, but the QWERTY keyboard has remained the same. Dr. August Dvorak was so dissatisfied with the standard keyboard that he devised his own layout, called the Dvorak Simplified Keyboard (DSK, see Figure 2). The program shown in the listing DVORAK.BAS will convert the IBM PC's QWERTY keyboard to a DSK.

To use the program, type RUN to install the new keyboard routine in memory, then type RUN 30 to switch into Dvorak mode. The keyboard will be defined as a DSK. To return to QWERTY operation, type RUN 50—but remember, you must type that command using the DSK layout.

Donald Gau
Houston, Texas

Editor's note: The DSK program resides in memory beginning at location 0000:C000 and cannot be used outside of BASIC. Anyone who converts Mr. Gau's program for use outside of BASIC is encouraged to submit their work for publication in this column. (Hint: Use DOS calls to determine and redirect interrupt 16H and use interrupt 27H to reserve an area of memory in which the program can reside.)

Join the *.* global exchange. We'll pay \$25 to \$100 for each item published. Send your personal computer discoveries to Star-Dot-Star, PC World, 555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or The Source STE908. ●

PC WORLD

Don't miss our
special subscription offer.

See page 308 for details.

Business as Usual?

Business as usual these days means a computer that's up and "humming." But if your computer were stolen or damaged, you wouldn't have business as usual.
YOU'D HAVE TROUBLE!

You can get fast replacement for your entire system and be back in business in a hurry by protecting your computer with SAFEWARE Personal Computer Insurance. It's the only coverage designed specifically for personal computers used for business — in your office, shop or home.

SAFEWARE protects ALL hardware, ALL purchased software and ALL media against theft, damage or any other kind of loss, regardless of use, after a low \$50 deductible.

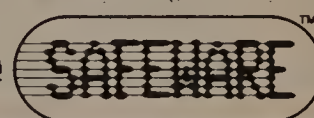
*(Not without
your computer
it wouldn't be.)*

Fast, courteous claims handling prevents your losing valuable business computing time.

Find the premium price for the coverage you need listed in the table below, available for as low as \$35 per year. Fill in the coupon today. Your coverage will begin as soon as your coupon application is received. Or for even faster coverage, call our toll free number:

1-800-848-3469

(In Ohio call 1-614/262-0559)
Phones open 8 a.m. to 8 p.m.,
Monday through Saturday



Total Hardware, Media & Software System Value	Annual Premium
Up to \$ 2,000	\$ 35
\$ 2,001-\$ 5,000	\$ 60
\$ 5,001-\$ 8,000	\$ 75
\$ 8,001-\$11,000	\$ 90
\$11,001-\$14,000	\$105

Call toll-free for rates on higher coverage
Coverage differs in Texas
It is an underwriting requirement that you insure
your system for its full value

PCW

Mail to: SAFEWARE, P.O. Box 02211, Columbus, OH 43202

Before I'm out of business,
please issue my SAFEWARE Insurance Coverage

Name _____
Street _____
City _____ State _____ Zip _____
System value \$ _____ (Check Enclosed) VISA MasterCard
Card # _____ Exp. Date _____

COMPUTERS and more...

is your place to buy for SELECTION, SERVICE and SAVINGS.

We know that your needs are not the same as everyone's, so we don't treat you "just like every one else."

Your needs are special. That's why **COMPUTERS and more...** is your place to buy for...



... SCHOOL

COMPUTERS

IBM	EAGLE
64KPC w/2-320 drives 2295	PC XL 3395
PC XT w/256KRAM 4795	Spirit II 2699
PCJR 128K ... CALL	

CORONA

APPLE	DeskTop w/2 drives ... 2369
The Macintosh call	Portable w/2 drives 2195
Apple Starter System 1299	
Apple IIe 899	
New Apple Products, call	

TELEVIDEO

COLUMBIA	TS 1605 CALL
1600-1 w/1 year war. 2495	Teletote SALE
1600-1 Pack w/1 yr. war. 2795	Multi-User Systems ... CALL
1600-4 CPU only 3454	
VP Portable 2349	

ZENITH

1600-1 w/1 year war. 2495	Z150 ON SALE
1600-4 CPU only 3454	Z160 CALL NOW
VP Portable 2349	

DEC

Rainbow 100 2295	SHARP
Rainbow 100 + ... 4495	PC-5000 1529

NEC

KAYPRO	We sell and service all
Kaypro II 115	Nec Micros CALL
Kaypro II + or 4+ .. CALL.	

LEADING EDGE

FRANKLIN	PC 2199
Ace 1000 799	
Ace OMS CALL	

COMPAQ

Compaq 2-drive 128K 2599	
Compaq Plus 3995	

ACCESSORIES

IBM

Access 1-2-3 389	R10-Plus 64K 269
Keytronic 5150 189	R10 64K + 1/0 cd ... 269
Keytronic 5151 219	SR10 by STB on sale
Hercules Card 349	Optical Mouse by Visi 199
AST 6-Pack 265	Quadboard Ex 64K .. 319
AST PC Net CALL	Quadboard II 64K .. 249
Plantronic Color Bd . 369	Quadvue 289
Z-Plus by CCS 679	Orchid Tech CALL
Graphix Plus by STB 319	1200B w/Sft 429
256K cd by STB ... 379	Tecmar Access ... CALL

APPLE

80 Col 64K for IIe ... 116	80 Col Card 109
Par Interface 54	294 K by Syntex 499
Serial Card 79	MicroModern IIe w/Sft 239
Buffered Grappler + . 159	Koala Pad 79
Z-80 Card 97	Appli-Cards call

PROMPT DELIVERY!

... HOME

PRINTERS

JUKI

6100 18 cps 419	
Tractor 109	
Cut-Sheet Feeder ... 529	

EPSON

Fx-100 CALL	
Fx-80 CALL	
LQ-1500 NEW	

ABATI

LQ-20 Parallel 389	
LQ-20 Serial 429	

DAISYWRITER

Daisy 2000 w/48 K Buf. 949	
Tractor for 2000 119	
Cut-Sheet Feeder 659	

RICOH

RP-1300 35 cps 979	
RP-1600 45 cps Ser. 1395	
RP-1200 20 cps L/Q . 689	
Tractor-All Models .. 219	

TRANSTAR

Transtar 120P 399	
Transtar 120S 399	
Transtar 130P 579	
Transtar 130S 579	
Tran 130 Sheet Feeder 329	

TOSHIBA

P1351 P 1599	
P 1351 S 1599	
P 1340 P 799	
P 1340 S 799	

RITEMAN

Riteman Plus 329	
Riteman Blue 359	

MANN-TALLY

We carry all	
Mann-Tally Printers CALL	

SIEMANS

PT 88 Ink Jet 759	
Pt 89 Ink Jet 994	

ANADIX

9500 B 995	
9625 B 1195	
9000 B 989	

STAR

Power Type - New CALL	
Delta IO & 15 CALL	
Gemini 10x & 15x . CALL	
Radix 10 & 15 CALL	

OKIDATA

Call for our low sole prices	
on all OKI Printers	

FREE * SHIPPING

PLOTTERS

AMDEK

Amplot-4 Color 719	
Amplot II Digital 899	
X-Y 6 Color 949	

HOUSTON-INST

DMP-40-2 call	
DMP-40 P 959	

ENTER

Sweet-P for Apple ... 729	
Sweet-P for IBM 789	
Sweet-P Model 100 .. 519	

C-ITOH

Cx-4800 549	
-------------------	--

STROBE

M100 1-Pen .. 489	
M260 8-Pen .. 779	

DISK DRIVES

Tandon 100-2 219	
CDC for IBM (320 K) 229	
SPECIAL NOTE TO OUR CUSTOMERS:	
Because Hard Disk Drive companies are re-	
thinking their prices downward, please call for	
latest prices for: QUADRAM, TECMAR, DA-	
VONG, CORVUS, PEGASUS AND OTHERS.	

... OFFICE

SOFTWARE

FOR PC & XT

Easywriter I 189	
Lotus 1-2-3 319	
Lotus Symphony call	
R-Base 4000 349	
DesQ 339	
MultiMate call	
Volkswriter DeLux 199	
Wordstar on sale!	
Home Accountant Plus : 99	
Concurrent CP/M 86 ... 239	
CP/M 86 CALL	
T.I.M. 329	
Q Base 139	
Verse Form 279	
Ask Micro (ea package) 389	
Smartcom II 99	
Inview 219	
Micro Terminal 69	

FOR JR.

Home Acct. Jr. 54	
Tax Advantage Jr. 54	
Personal Development 67	
Filewriter 2 119	
Rescue at Rigel 24	
Easywriter I Sys. 189	
Kids on Keys Jr. 24	
Creative Calc. 34	
Creative Filer 34	
Creative Writer 34	
Pipes 24	
Save New York 24	

APPLE

Friday 169	
C Dex (each) 36	
Quick Code 179	
Micro Pro on sale!	
PFS: File 83	
PFS: Report 83	
PFS: Graph 83	
Visicalc 3.3 169	
Visicalc Enhanced .. 179	
Letter Perfect w/Mail 99	
dBase II call	
Tax Prepare '84 179	
Magic Window II ... 97	

MAC

Friday 199	
dBase II 499	
Micro Soft Basic 119	
MultiPlan 139	
Chart 99	
Call for our free price list	
of software	

MONITORS AND TERMINALS

Princeton Hx-12 464	Zenith 131 319
Princeton SR-12 ... on sale!	Zenith 135 487
Princeton Max-12 179	Zenith 122 109
Taxan 420 467	Amdek 310 A 159
Taxan Amber 119	Amdek Color II 429
Taxan Kx-122 159	Amdek Color IV ... 799
Quadram Quadchrome 499	NEC 1216 419
Quadram Color II 449	

TERMINALS

WYSE 300 989	Televideo 914 539
WYSE 100 689	Televideo 924 687
QUME 102A 534	Televideo 910+ ... 549
QUME 103A CALL	Televideo 950 895

SERVICE

EXTENDED WARRANTIES AND FAST REPAIR BY QUALIFIED TECHNICIANS FOR OUR ENTIRE LINE. CALL FOR MORE INFO.



COMPUTERS and more.....

3620 30TH ST., SAN DIEGO, CA 92104

TO ORDER (619) 291-1442

TOLL FREE 1-800-433-9449

VISA

MasterCard

"SE HABLA ESPANOL"

P.O.'S ACCEPTED ON APPROVAL

* On All Pre-paid Cash Orders In Cont. U.S.

Circle 629 on reader service card



1 Year Warranty Available

TO ORDER. Phone orders invited using Visa, MasterCard, or bank wire transfers. Visa, MC, service charge of 2%. Mail orders may send charge card number (include expiration date). Cashiers check, money order, or personal check (allow 10 business days for personal or company checks to clear). Please add 3% (\$5.00 minimum) for UPS shipping, handling, and insurance. All equipment is in factory cartons with manufacturer warranty. Opened products not returnable. Restocking fee for returned merchandise. Equipment subject to price change and availability. Retail prices differ from mail order prices. Calif. residents add 6% State Tax. Company and school P.O.'s accepted on approval. IBM & Apple are registered trademarks.

INTERNATIONAL INQUIRIES WELCOMED
TELEX 697120, DATAMAX ATTN: DEPT. 322

For your IBM/PC

mbp COBOL: 4 times faster, and now with SORT & CHAIN.

\$750.

mbp COBOL can be summed up in one word: fast.

Because it generates native machine language object code, the mbp COBOL Compiler executes IBM/PC* programs *at least* 4 times

faster (see chart). Fast also describes our **new SORT**, which can sort four-thousand 128-byte records in less than 30 seconds. A callable subroutine or

stand-alone, 9 SORT control fields can be specified. And our **new CHAIN** is both fast and secure, conveniently transferring control from one program to another, passing 255 parameters. Plus, **new extensions** to ACCEPT & DISPLAY verbs give better, faster interactive programming.



GIBSON MIX Benchmark Results

Calculated S-Profile
(Representative COBOL statement mix)

Execution time ratio

mbp COBOL	Level II** COBOL	R-M*** COBOL	Microsoft**** COBOL
1.00	4.08	5.98	6.18

128K system with hard disk required. *IBM/PC is an IBM TM, **Level II is a Micro Focus TM; ***A Ryan McFarland TM, **** A Microsoft TM.

The
complete
COBOL.



mbp Software & Systems
Technology, Inc.

7700 Edgewater Drive, Suite 360, Oakland, CA 94621
Phone 415/632-1555

Please send complete mbp COBOL information to:

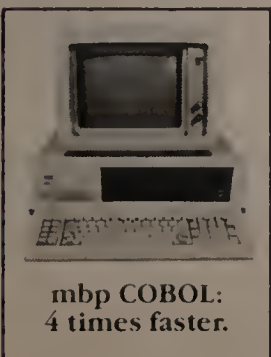
NAME _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____



mbp COBOL:
4 times faster.

An Interactive Symbolic Debug Package included standard; Multi-Keyed ISAM Structure; listing options allow source & object code, map & cross-reference checking; GSA Certification to ANSI '74 Level II; mbp has it all.

It's no surprise companies like Bechtel, Chase, Citicorp, Connecticut Mutual, and Sikorsky choose mbp COBOL; make it your choice, too. mbp is available at Vanpak Software Centers, or direct; just send the coupon, or call for complete information—today.

Circle 100 on reader service card

ORDER DESK ONLY
(800) 292-3360
TOLL FREE OUTSIDE CALIF.

ORDER DESK ONLY
(800) 292-3360
TOLL FREE IN CALIFORNIA

"WHY PAY MORE" COMPARE THESE PRICES MC-P APPLICATIONS Brings Software & Hardware At Unbeatable Prices

SOFTWARE

	LIST	OUR
ASHTON TATE		
dBase II	\$700	\$295
Friday	295	175
CONTINENTAL		
Home Accountant	150	105
FOX & GELLER Quick Code ..	295	174
Quick Code & Dutilpak		174
FUNK SOFTWARE Sideways ..	60	45
HOWARDSOFT		
Real Estate Analyzer II	250	165
HUMAN SOFT DB Plus		89
LIFEBOAT SYSTEMS		
Lattice 'C' Compiler	500	325
LIFETREE Volkswriter Deluxe ..		175
LIVING VIDEOTEXT		
Think Tank	195	125
LOTUS — 1-2-3	495	299
MICROPRO Spell Star	250	155
Mail Merge	250	155
Super Sort	250	135
Calc Star	145	86
Info Star	495	325
Word Star Pro w/Correctstar ..	695	369
MICRORIM R Base 4000	495	325
MICROSTUF Crosstalk	195	109
MICROSOFT		
Multiplan	250	129
Flight Simulator	50	35
Multitool Word W/Mouse	475	295
Pascal Compiler	350	245
C Compiler	500	325
PETER NORTON		
Peter Norton Utility	80	55
PBL CORPORATION		
Personal Investor	145	98
PEACHTREE Peach Pack	595	249
ROSESOFT Prokey		95
SATELLITE Word Perfect	495	325
SOFTWARE DIMENSIONS		
Accounting Plus		
GL, AR, AP, PR, INV—Each ..	599	399
SOFTWARE PRODUCT INTERNATIONAL		
Open Access	595	369
SOFTWARE PUBLISHING		
Pfs:File	140	79
Pfs:Report	125	79
SOFTWARE WORD SYSTEMS		
Multimate	495	275
SORCIM SuperCalc II	295	175
SuperCalc III	395	239
Super Writer	295	205
STATE OF THE ART (FM Series)		
GL, AP, AR, INV, PR—Ea. ...	595	375
VISICORP Visicalc IV	250	175
Visifile	300	195
VisiTrend/Plot	300	195
VisiSchedule	300	195

Monthly Specials

Tandon TM 100-2
\$205⁰⁰
AST SIX PAK (64K)
\$265⁰⁰
AMDEK 310A
\$169⁰⁰
MULTIMATE
\$275⁰⁰
IRMA 3270
\$1045⁰⁰
OPEN ACCESS
\$369⁰⁰

Value Paks

LOTUS 1-2-3
\$299⁰⁰
PLANTRONIC +
PRINCETON GRAPHIC
\$869⁰⁰
R:BASE 4000 +
MULTITOOL WORD
W/MOUSE
\$585⁰⁰
LOTUS 1-2-3 +
HERCULES CARD
\$669⁰⁰

ORDER STATUS &
TECHNICAL
SUPPORT — CALL
(408) 293-3360

Call for Hardware &
Software Prices Not
Listed This Ad

Used PC's & Apples
Bought & Sold

HARDWARE

	LIST	OUR
HAYES MICROCOMPUTER PRODUCTS		
Stack Smart Mod 300	\$289	\$199
Smart Mod 1200 B (IBM)	599	429
Smart Mod 1200	699	495
MOUSE SYSTEMS		
P.C. Mouse w/Software	295	219
NOVATION		
J-Cat	149	105
Smart-Cat 103/212	595	445
Smart-Cat 103	249	187
KRAFT & TG JOYSTICKS	70	35
ELECTRONIC PROTECTION DEVICES		
Orange	140	94
Peach	98	64
IBM PC 64K/2 Drives/		
Controller Cd.		2169
IBM XT		4399
AST RESEARCH		
Megaplug 64K	395	265
Six Pac Plus 64K	395	265
QUADRAM		
Quadboard II 64K	395	275
Quadcolor I	295	219
Quad 512 + 64K	325	245
Quadlink	680	525
STB COLOR GRAPHIX CARD		375
TANDON		
TM 100-2 Drive	395	209
TALL GRASS		
Hard Disc & Tape, 12 Mgb....	3495	2995
TEAC HALF HEIGHT		199
PEGASUS		
Hard Disk 10 Mgb (internal)		1195
PRINTERS		
Epson FX 100		725
IBM Parallel Printer Cable ..	50	37
NEC 7730 RO Parallel	2595	2295
Okidata 92	699	459
Qume 1140 plus	1685	1349
MONITORS		
Amdek MAI Board	599	435
Amdek 12" 310A	230	169
Amdek Color II RGB Hi-Res ..	529	399
Hercules Graphics Card	499	359
Princeton RGB Hi-Res	795	485
Plantronics Color Card	595	385
USI PI3	249	149
Verbatim/Maxell s/s d/d		24
d/s d/d		38

International
Dealer Inquiries
Welcomed

MC-P APPLICATIONS, Inc.
1630 Oakland Road, Suite D114
San Jose, CA 95131, USA Phone (408) 293-3360
Telex: 821396 MCPA UD
HOURS: 8:30 a.m. to 5:30 p.m. — Mon. - Sat.
Call for Prices in Australia at 02-929-8468

TERMS: All prices subject to change. Cashier's check/MO/
Bank Transfer. Allow time for company or personal checks to
clear. Prices reflect cash prepaid discount. VISA/MASTER
CARD/COD/PO's 3%. California residents add sales tax.
SHIPPING: \$4 per item for UPS surface (\$8 for Blue Label);
Monitors \$20, Printers \$25, within continental USA.

COMPUCLASSICS

INCREDIBLE PRICES WITH PROFESSIONAL SUPPORT

SOFTWARE

ASHTON TATE

D BASE 11	\$375
FRIDAY	169

CONTINENTAL SOFTWARE

HOME ACCOUNTANT PLUS	85
PROPERTY MANAGEMENT	319

DIGITAL RESEARCH

C BASIC COMPILER	360
PASCAL MT + ...	360
C	209

LOTUS DEVELOPMENT

1-2-3	309
-------------	-----

MICROPRO

INFOTAR	239
WORDSTAR	235
WORDSTAR PRO-PAC	345
MAILMERGE	129
CORRECTSTAR	129
PLANSTAR	289

MICROSOFT

MULTIPLAN	125
WORD	239
WORD AND MOUSE	299
BASIC COMPILER	249
PASCAL COMPILER	249
FORTRAN COMPILER	265
BASIC INTERPRETER	265

MICRORIM

R BASE 4000	289
EXTENDED REPORT WRITER	89

MONOGRAM

DOLLARS AND SENSE	109
-------------------------	-----

SATELLITE SOFTWARE INTL.

WORD PERFECT	279
--------------------	-----

SOFTWARE PRODUCTS INTL.

OPEN ACCESS	379
-------------------	-----

SORCIM

SUPERCALC II	159
SUPERCALC III	229

SOFTWARE WORLD SYSTEMS

MULTIMATE	289
-----------------	-----

- WE ACCEPT VISA & MASTER CHARGE.
- NO CREDIT CARD SURCHARGE.
- FREE TECHNICAL SUPPORT.
- CALL FOR OTHER SOFTWARE & HARDWARE PRICES.

HOURS

ORDER DESK & TECHNICAL SUPPORT OPEN:

8AM - 6PM MONDAY THRU FRIDAY

10AM - 2PM SATURDAY

6860 CANBY ST. (SUITE 109)

RESEDA, CA 91335

TLX 292415 KET UR

SHIPPING

\$4 per item UPS surface (\$8 for Blue Label); printers \$25

SOFTWARE PUBLISHING

PFS REPORT	\$69
PFS FILE (IBM)	85
PFS FILE (APPLE)	69
PFS GRAPH (IBM)	85
PFS GRAPH (APPLE)	69
PFS WRITE (IBM)	85
PFS WRITE (APPLE)	69

LEADING EDGE SOFTWARE

WORDPROCESSOR	175
WORDPROCESSOR/MERGEPRINT	199
NUTSHELL	199

WOOLF SOFTWARE

MOVE-IT	85
---------------	----

MICROSTUF

CROSSTALK	109
INFOSCOPE	125

PEACHTREE

PEACH PAK 4	229
PEACH TEXT 5000	229

HARDWARE

HAYES

SMARTMODEM 300	205
SMARTMODEM 1200B	409
SMARTMODEM 1200	489

HERCULES GRAPHICS CARD

.....	349
-------	-----

MICROSOFT

64K RAM CARD	235
256K RAM CARD	359

C.ITOH

PROWRITER 8510	349
PROWRITER 1550	629
STARWRITER 40CPS	1100

STAR MICRONICS

GEMINI 10X	285
GEMINI 15X	419

AST RESEARCH

MEGAPLUS 64K	275
SIX PAC PLUS 64K	275

OKIDATA

MICROLINE 82A	329
MICROLINE 92	469
MICROLINE 93	785

TO ORDER CALL:

1-800-328-4473 or (818) 705-1895 (CA.)

TERMS

ALL prices subject to change. We honor Cashiers Cheque/MO/Bank transfers immediately. Allow time for company & personal cheques to clear. California residents add sales tax.



INDEPENDENT STORE IN NYC DEDICATED TO IBM® PC SOFTWARE AND PERIPHERALS ONLY

IN STORE WE DEMONSTRATE MOST PRODUCTS WE SELL—BY APPOINTMENT ONLY

STORE HOURS: 9:00 A.M.—5:30 P.M. E.S.T. MON.—FRI.

Saturdays closed for months of July, Aug., Sept.

Terms, conditions and prices differ in our store.

PC LINK, CORP. 29 WEST 38TH ST. 2ND FL., NEW YORK, NY 10018

HELIX BUBBLE MEMORY BOARDS CALL

WE ARE CELEBRATING OUR FIRST ANNIVERSARY.

All Prices Listed here are strictly subject to our current stock Available for Anniversary Sale.

BUSINESS SOFTWARE

ALPHA SOFTWARE

DATA BASE MANAGER II	\$205.00
EXECUTIVE PACKAGE	109.00
TYPE FACES	89.00

ASHTON-TATE

dBASE III	CALL
BOTTOM LINE STRATEGIST	299.00
FINANCIAL PLANNER	399.00
FRIDAY	179.00

CONTINENTAL

HOME ACCOUNTANT PLUS	85.00
ULTRA FILE	139.00
TAX ADVANTAGE	45.00
PROPERTY MANAGEMENT	319.00

ENERTRONICS

ENERGRAPHICS	CALL
--------------------	------

FOX & GELLER

D. GRAPH	189.00
DIUTIL	69.00
GRAFOX	209.00
OZ	CALL
QUICKCODE	189.00

FRIENDLYSOFT

FRIENDLY WRITER	50.00
-----------------------	-------

HARVARD SOFTWARE

HARVARD PROJECT MANAGER	CALL
-------------------------------	------

HAYES

SMARTCOM II	95.00
-------------------	-------

INNOVATIVE SOFTWARE

TIM IV	CALL
--------------	------

I U S

ACCOUNTING AR/AP/GL ea	295.00
INVENTORY CONTROL	295.00
ORDER ENTRY	295.00
PAYROLL	345.00
EASY WRITER II SHELLER MAIL	CALL
EASY FILER	240.00
EASY PLANNER	169.00

LOTUS DEVELOPMENT CORP.

LOTUS 1-2-3. (NO MAIL ORDERS) ..	CALL
SYMPHONY (NO MAIL ORDERS) ..	CALL

MICRO DATA BASE

KNOWLEDGE MAN	CALL
---------------------	------

MICRO PRO

INFOTAR	CALL
WORDSTAR	CALL
WORDSTAR PROFESSIONAL	CALL

MICROSOFT

MULTIPLAN	179.00
COMPILERS	CALL

NORTH AMERICAN BUSINESS

MEMORY SHIFT	69.00
--------------------	-------

NORTON COMPUTER

NORTON UTILITIES	55.00
------------------------	-------

PC SOFTWARE

CREATABASE	65.00
------------------	-------

PEARL SOFT

PERSONAL PEARL	CALL
----------------------	------

ROSE SOFT

PROKEY 3.0	89.00
------------------	-------

SOFTWARE ARTS

TK SOLVER	299.00
FINANCIAL MANAGEMENT	89.00
MECHANICAL ENGINEERING	89.00

SOFTWARE SYSTEMS INC.

MULTIMATE	295.00
-----------------	--------

SORCIM

SUPERCALC III	299.00
---------------------	--------

VISICORP

VISICALC FOUR	179.00
DESKTOP PLAN	190.00
VISIFILE	190.00
VISITREND VISIPLLOT	190.00
VISIWORD	190.00

DISK DRIVES

CORVUS	CALL
PEGASUS	CALL
QUME T142	CALL
SYSGEN	CALL
TANDON TM 100-2	200.00

MULTIFUNCTION BOARDS

64 RAM CHIPS	55.00
AST CARDS	CALL
QUADBOARD CARD	CALL
AMDEK MAI CARD	CALL
PC MOUSE	CALL
FTG LIGHTPEN	CALL
PLANTRONICS COLOR PLUS CARD ..	CALL
HERCULES	CALL
PRINCETON GRAPHICS	CALL

ENTERTAINMENT & EDUCATION

ATI TRAINING PACKAGES	ea. 55.00
ATTACK ON ALTAIR	29.00
COMPUTER FACTS IN 5	22.00
CONQUEST	29.00
DEADLINE	37.00
DIGGER	29.00
THE EXTERMINATOR	29.00
FLIGHT SIMULATOR	35.00
FRIENDLY ARCADE	32.00
FRIENDLY PC INTRO SET	32.00
FROGGER	25.00
GORGON	29.00
HIDE & SINK	22.00
HI RES #4	27.00
MOON BUGS	29.00
MY LETTERS, NUMBERS & WORDS ...	32.00
PC CRAYON	39.00
PC TUTOR	49.00

PLANET FALL	39.00
SERPENTINE	25.00
SPINNAKER SERIES	CALL
SPYDER	29.00
STYX	29.00
SUSPENDED	39.00
WITNESS	39.00
WIZARDRY	49.00
ZORK I, II, III	ea 27.00
ZURAN DEFENDER	25.00
FUNTASTIC	CALL
BIG TOP	27.00
COSMIC CRUSADERS	27.00
MASTER MINER	27.00
SNACK ATTACK	27.00

ACCESSORIES

CURTIS PRODUCTS

DISPLAY PEDESTAL	\$50.00
MONO CABLE	38.00
KEYBOARD CABLE	30.00
SYSTEM STAND	17.00
KRAFT JOYSTICK	39.00
HAYES MACH III JOYSTICKS	45.00

MONITORS

AMDEK 310A	\$175.00
COLOR II+	CALL
PRINCETON GRAPHIC HX-12	489.00
SR-12	CALL
ZENITH RGB MONITOR	499.00

MODEMS

HAYES SMART MODEM	\$205.00
HAYES SMART MODEM 1200	495.00
HAYES SMART MODEM 1200B	449.00

DISKETTES

DYSAN	
S.S. D.D.	\$30.00
D.S. D.D.	38.00
MAXELL	
S.S. S.D.	27.00
D.S. D.D.	38.00
VERBATIM (5 year warranty)	
21144 HEAD CLEAN KIT	10.50
S.S. D.D.	26.00
D.S. D.D.	36.00

PRINTERS

DIABLO P32 D-MATRIX	CALL
DIABLO 630	\$1699.00
DIABLO 630 TRACTOR FEED	249.00
DYNAX DX-15 OR DX-25	CALL
PROWRITER F10	925.00
IDS PRISM 132 COMPLETE	1499.00
OKIDATA 92P	465.00
93P	699.00
TOSHIBA P1351	1499.00
TOSHIBA P1340	CALL
EPSON FX SERIES	CALL
NEC 3550	CALL
PRINTER CABLE PARALLEL	25.00

CALL TOLL FREE 800-221-0343

All prices listed in this ad are effective Aug. 1-31, 1984. All Brands are Registered Trademarks. IBM is a Registered Trademark of IBM Corp.

IN NEW YORK CALL 1-212-730-8036

TERMS AND CONDITIONS

We reserve the right to repair, replace or return to manufacturer for repair, all goods acknowledged faulty or damaged on receipt by customer. **Customer must call for Return Authorization Number before returning any goods.** Prompt attention will be given to all damaged and faulty returned goods. Any goods returned for credit are subject to 10% restocking charge, plus shipping charge. No returns for credit on any software. Customer must deal with the manufacturer directly if the customer finds any false claims made by

the manufacturer. All goods are shipped U.P.S. only. Add 2% of price, or minimum of \$3.00 for shipping. We do not ship C.O.D. Please allow one to two weeks for personal or corporate checks to clear. To expedite shipping send money order, certified cashier's check, or charge to your VISA, MasterCard, **WE DO NOT Add a Service Charge For Credit Card Usage.** Prices subject to change without notice. **NOT RESPONSIBLE FOR TYPOGRAPHICAL ERRORS**

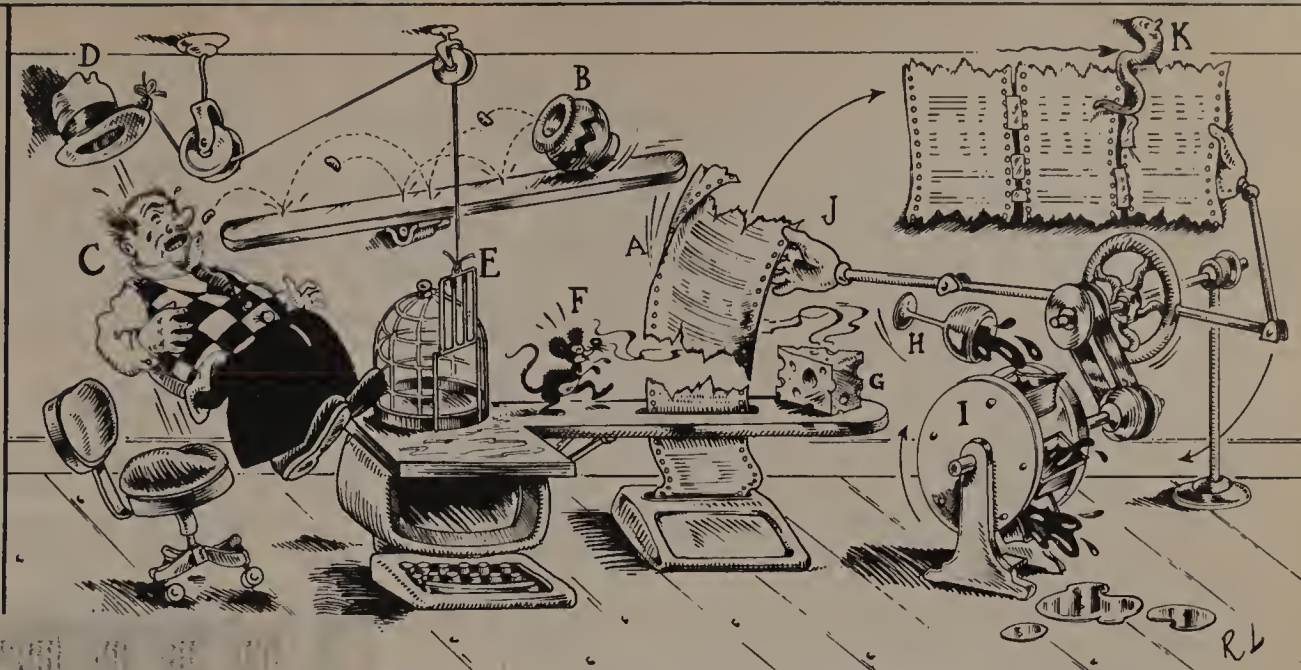
SIMPLIFIED SPREADSHEET ASSEMBLY

RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOLATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE (G), GNaws THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



MADE SIMPLE.

Now you can save time, aggravation, adhesive tape, and Gorgonzola cheese by following one simple direction—Sideways. It's the unique software program that lets you output all the spreadsheet columns you need, all on one continuous page, all with one print command—and all for only \$60!

With Sideways on your side, no spreadsheet you invent with Lotus 1-2-3™, VisiCalc®, Multiplan™, or SuperCalc™ is too wide! And it's just as powerful an ally when you're creating far-into-the-future schedules and pert charts with your word processor. In fact, for any wide text file, for dozens of uses, the way to go is Sideways.

The experts agree. *PC Magazine*, for example, writes: "If you've got the need, Sideways has the solution." And *PC World* calls Sideways "nifty . . . an easy to use program that does what it claims."

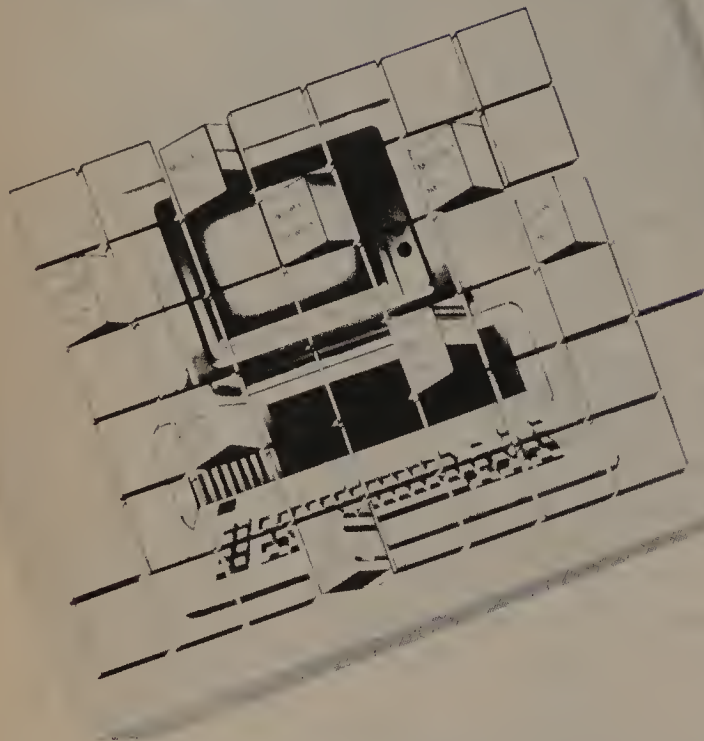
You can go Sideways today with an IBM® PC and an IBM®, Epson, Okidata, Prism™ or Pro-writer™ printer. Ask for Sideways at your local ComputerLand® or other leading computer stores. Or mail a \$60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. (617) 497-6339. MC/Visa accepted. Send no Mexican jumping beans, please.

SIDEWAYS™

FOR EASY-READING HARD COPY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

PC NETWORK WHOLESALE CATALOG



**WHOLESALE + 8% PRICING
OUR 400 PAGE CATALOG
OVER 20000 PRODUCTS
FROM 600 MANUFACTURERS
AND 12 TO 21 DAY
SOFTWARE RENTALS
ARE JUST THE BEGINNING
FOR NETWORK MEMBERS ONLY ...**

For as little as \$8 per year you can join the thousands of value wise buyers who have saved more than \$8,000,000 on 25,000 orders over the last six months and received these 15 unique benefits:

- Wholesale + 8% Pricing
- Our 400 Page Catalog—Over 20000 Products
- In-stock Delivery On Popular Products
- Experienced Sales Consultants
- Add-on Quantity Discounts
- Free Technical Support
- 12-21 Day Business Software Rentals (optional)
- 12-21 Day Game Software Rentals (optional)
- Special Savings Newsletters "The Printout"
- Discount Book Library—Over 1000 Titles
- Membership Referral Bonus
- Corporate Accounts
- Software Publishing Assistance
- Membership Refund Guarantee
- 10 Day Hardware Return Policy

PC NETWORK Members come back to buy

PC NETWORK Members join America's Number 1 Computer Buying Service because they recognize a great value. So it makes sense that sometimes our value-wise customers may check another source before making their purchases. And it makes sense that they come back to PC NETWORK to buy—at just 8% over the wholesale price plus shipping.

We know of no "discount" house, computer store, retail shop, direct mail outlet or imitator that can beat our consistently low prices or match our tremendous selection of products!

We Invite You To Compare

Shop around. Then add up the transportation costs and time spent on the phone or traveling from store to store. Or remember frustration you may have experienced asking an untrained order-taker or sales clerk about compatibility, language requirements, memory capacity, price comparisons . . .

Or call us first. Our trained personnel will gladly answer all your questions and quote you the best prices on the largest selection of computer software and hardware in the nation! And when you buy, it's all delivered right to your doorstep from our multimillion dollar inventory—quickly!

CALL 1-800-621-S-A-V-E

In Illinois call (312) 280-0002

Your Membership Validation Number: W281



You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD or AMERICAN EXPRESS. Our knowledgeable service consultants are on duty Mon-Fri 8 AM to 7 PM, SAT 9 AM to 5 PM CST.

**PERSONAL COMPUTER NETWORK
320 West Ohio
Chicago, Illinois 60610**



Call now...Join the PC NETWORK and start saving today!

Our Members depend upon the high quality of PC NETWORK's Software Rental Libraries and its 12-21 day evaluation period!

Many Members have taken advantage of the savings and convenience our Software Rental Libraries have to offer. They know we have the latest versions of all the most important software titles, and that their orders will be shipped promptly! *Furthermore, our 12-21 day rental period is the longest in the industry.* Maybe that's why so many folks have switched to the PC NETWORK for their software needs.

The nation's largest corporations depend on PC NETWORK

Our corporate roster includes some of the nation's largest financial, industrial and professional concerns. Their buyers know that purchasing or renting from PC NETWORK saves them time, money and trouble. They also count on us for product evaluation, professional consultation and the broadest spectrum of products and brands around. Call and ask about our Major Corporation Membership Program, and feel free to inquire which companies have already joined!

Copyright ©1984, PC NETWORK INC.

Buy Hardware And Software at Wholesale + 8% And Get 12-21 Day Software Rentals† ...

Below is a sampling of the over 20,000 products available from the NETWORK at our everyday low prices!

GAMES & EDUCATIONAL SOFTWARE

(Please add \$1 shipping and handling for each title ordered from below.)

	Wholesale		Wholesale
Avant-Garde Air Trefic Controller	\$18.50*	Sierra On-Line Frogger	21.00*
Bluebush Chess (Your Toughest Opponent)	34.00*	Sierra On-Line Crossfire	18.00*
Broderbund Lode Runner	19.75*	SubLogic Night Mission Pinball	24.00*
CBS Goren-Bridge Made Easy	48.00*	Spinnaker Alphabet Zoo	17.00*
Epyx Temple of Apshai	21.97*	Spinnaker Delta Drawing	29.00*
Infocom Zork I, II, or III	21.50*	Spinnaker FaceMaker	20.00*
Infocom Deadline, Witness or Suspended	27.00*	Spinnaker Hey Diddle Diddle	17.00*
Microsoft Flight Simulator	27.00*	Spinnaker KinderComp	17.00*
Orion JBird (QBert Look Alike)	22.00*	Spinnaker Rhymes & Riddles	17.00*
Orion PCMan (Greet Pac Men)	21.00*	Spinnaker Story Machine	20.00*
Scarborough MasterType	27.00*	Spinnaker Most Amazing Thing	23.00*
Screenplay Asylum (works with mono card too)	15.50*	Virtual Combinatics Micro Cookbook	21.00*

BUSINESS SOFTWARE

(Please add \$2.50 shipping and handling for each title ordered from below.)

ATI How to use MultiMate	\$44.00*	Microsoft Multiplan	105.00*
ATI How to use Microsoft Word	44.00*	Microsoft CrossTalk XVI	93.00*
ATI How to use Lotus 1-2-3	44.00*	Monogram Dollars & Sense	85.00*
Ashton-Tate Friday!	156.00*	Multimate Systems Multimate V3.2	250.00*
Central Point Copy II PC	23.00*	Oasis The Word Plus	90.00*
Conceptual Instruments Desk Organizer	150.00*	Peter Norton Norton Utilities	46.00*
Digital Research CP/M-86	30.00*	Rossoft Prokey Version 3	74.00*
Digital Research PL/I Compiler	399.00*	Satellite Software WordPerfect	210.00*
Funk Software Sideways	38.00*	Softcraft Fancy Fonts	125.00*
Harvard Harvard Project Manager	215.00*	Software Publishing PFS: File	74.00*
Hayes Smartcom II	66.00*	Software Publishing PFS: Write	74.00*
Lotus Development Lotus 1-2-3	CALL	Software Publishing PFS: Graph	74.00*
MicroRim RBese 4000	260.00*	Sorcim Supercalc 3	196.00*
Microsoft C Compiler	275.00*	SPI Open Access	335.00*
Microsoft Word with Mouse—Latest Version	260.00*	Verbatim Disk Drive Analyzer	25.00*

HARDWARE

(Please add shipping and handling charges found in italics next to price.)

COMPLETE SYSTEMS

Apple Macintosh	CALL
Apple Apple IIc	CALL
Apple Apple IIe	CALL
Columbia Desktop & Portable Systems	CALL
Eagle Desktop PC and Spirit Portables	CALL
IBM PC 2 DSDD Floppy Drives/Color Card/Mono Monitor	2,147.00* (48.00)
IBM Hard Disk 1 Floppy/10Mb Hard Disk/128K/Color Card/Mono Monitor	2,902.00* (62.00)
Sanyo MBC 550 "Lowest Cost MS-DOS System"	710.00* (15.00)
Tava Complete IBM compatible (128K/Color Card/Mono Mon/2 drives)	1,710.00* (36.95)
Texas Instruments Professional	CALL

DISK DRIVES & CONTROLLERS

Cogito 1/2 Hi Low Power 10MB Winchester W/IBM Controller	620.00* (18.00)
IBM Floppy Disk Controller	150.00* (2.50)
Maynard WS-1 10MB Internal Hard Disk with Sendstar Multi Function Card	860.00* (18.00)
Maynard WS-2 same as WS-1 but with Sendstar Floppy Controller (uses 1 slot)	960.00* (20.75)
Maynard Floppy Controller/Serial Port	185.00* (2.50)
Panasonic Half Height DSDD Drive Pair	300.00* (6.92)
Qume Half Height DSDD Drive Pair (Same as used on IBM Portable)	350.00* (7.00)
Tandon TM100-2 Full Height DSDD Drive	172.00* (4.00)
Tallgrass 20MB External Hard Disk with Tape Backup	2,600.00* (46.20)
Teac FD55-B Half Height DSDD Drive Pair	300.00* (7.00)

MEMORY CHIPS

All chips guaranteed for life.

64K Memory Upgrade Kits (9 Chips)	43.20* (1.00)
64K Dynamic Rsm Chips (Esch)	4.80* (1.00)

MODEMS

Anchor Mark XII LOWEST PRICE 1200BPS HAYES COMPATIBLE EXTERNAL MODEM!	230.00* (5.00)
Hayes Smartmodem 300	160.00* (3.60)
Hayes Smartmodem 1200B with Smartcom II	388.90* (2.50)
Hayes Smartmodem 1200B without software	299.00* (2.50)
Rixon R212A Stand Alone 1200BPS	335.00* (8.50)
U.S. Robotics Pessword (Compact 1200BPS External)	290.00* (6.50)

MONITORS

Amdek Video 300G Composite Green	110.00* (3.00)
Amdek Video 300A Composite Amber	120.00* (3.00)
Amdek Video 310A IBM Type Amber	130.00* (3.00)
Amdek Color II+ RGB Color	362.00* (6.00)
Princeton HX-12 RGB Monitor	CALL
Princeton MAX-12 IBM Mono	CALL
Princeton SR-12 Ultra High Res RGB	CALL
Texan 210 Combo RGB/Composite	245.00* (6.00)
Texan 420 Super High Res RGB Monitor	400.00* (9.30)
Zenith ZVM-123 Green High Res (Consumer Reports Rated Best Buy!)	76.00* (2.50)

MULTIFUNCTION CARDS

Apparat 512K Memory Board with OK	65.00* (2.50)
Apparat Combo II w/ser/par/game/clock/stwr	123.00* (2.50)
AST Six-Pack Plus with OK	205.00* (2.50)
AST MegaPlus II with OK	205.00* (2.50)
AST I/O Plus II	105.00* (2.50)
AST Serial/Parallel/Game Port options for any AST Card	33.00* (1.00)
Quadram Improved Quadboard 384K with OK	197.00* (2.50)
Quadram Quadlink (Run Apple Code on IBM)	405.00* (2.50)
Tecmar Captain Multifunction Card with O/K	200.00* (2.50)

PRINTERS

Comrex/Brother CR-II 13CPS LQ Printer	399.00* (8.62)
Comrex/Brother Typewriter Keyboard for CR-II	150.00* (3.25)
Comrex/Brother Cut Sheet Feeder for CR-II	180.00* (3.89)
Epson RX-80	287.00* (6.00)
Epson FX-80	415.00* (9.25)
Epson FX-100	600.00* (14.35)
Epson LQ1500	CALL
Epson IBM-to-EPSON Parallel Cable	21.00* (1.00)
NEC 2050 20CPS Letter Quality Printer	765.00* (16.53)
NEC 3550 33CPS Letter Quality Printer	1,460.00* (31.54)
Okidata ML92P 160CPS 80 Col Printer	395.00* (8.55)
Okidata ML93P 160CPS Wide Pleten	655.00* (15.00)
Okidata IBM-to-Okidata Parallel Cable	20.75* (1.00)
Qume Sprint 11/45 45CPS Letter Quality	1155.00* (24.00)
Qume IBM Cable and Interface (required)	72.00* (1.00)
Texas Instruments 855 DP/LQ w/Tractor	716.00* (15.50)
Toshiba P-1351 160/100 CPS Drett/LO Printer	1,425.00* (32.00)

VIDEO CARDS

Hercules Monochrome Graphics Card	300.00* (2.50)
Hercules Color Card with Parallel Port	CALL
Persyst Monochrome Display Card	206.00* (2.50)
Quadram Quadcolor I Color Card	175.00* (2.50)
STB Graphics Plus	240.00* (2.50)
STB Clock Option for Graphics Plus	30.00* (1.00)

ACCESSORIES AND SUPPLIES

Brand Name DSDD Diskettes	20.00* (1.00)
Guaranteed for Life!!	
Curtis PC Pedestal II	54.00* (3.00)
Keytronic KB5151 Deluxe IBM Keyboard	186.00* (4.00)
WP Printer Paper 2600 Sheets	17.00* (10.00)
Microline Parts (Invisible when torn)	

*PC NETWORK Members pay just 8% above the wholesale price, plus shipping. All prices reflect a 3% cash discount. Wholesale prices fluctuate rapidly—all prices in this issue have been prepared 60 days in advance. Please call for latest prices. Minimum shipping 2.50 per order.

LATEST ISSUE Price Reductions!

As the NETWORK's volume grows our prices drop. The following popular products are now available at these new lower prices!

64K MEMORY EXPENSION	\$43.20* set
Set of 9 chips	Guaranteed for Life.
TANDON TM100-2 DRIVES	172.00* ea.
TEAC or PANASONIC	150.00* ea.
1/2 Height Disk Drives with Mounting Kit	

AMDEK MONITORS

V300G Composite Green	110.00*
V300A Composite Amber	120.00*
V310A IBM Amber	130.00*

NEC 3550

33 CPS-Letter Quality Printer	1,460.00*
-------------------------------	-----------

HAYES 1200B

Without Software	299.00*
------------------	---------

HAYES SMARTCOM/II

Communications Package	68.00*
------------------------	--------

HERCULES CARD

	300.00*
--	---------

*NETWORK members pay just 8% above these wholesale prices plus shipping.

PC NETWORK
320 West Ohio
Chicago, Illinois 60610

POSTAGE WILL BE PAID BY ADDRESSEE

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 14823 CHICAGO, IL

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

†RENT BEFORE YOU BUY—Members are eligible to join PC NETWORK's Business and Game Software Rental Libraries for a much smaller fee than other software rental services. And PC NETWORK's rental charges are far less—just 20% of the Members WHOLESAL PRICE.

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships only)
In Illinois call (312) 280-0002 validation code W281

Buy Hardware And Software at Wholesale + 8% And Get 12-21 Day Software Rentals† ...

Below is a sampling of the over 20,000 products available from the NETWORK at our everyday low prices!

GAMES & EDUCATIONAL SOFTWARE

(Please add \$1 shipping and handling for each title ordered from below.)

Wholesale	Wholesale
Avant-Garde Air Traffic Controller \$16.50*	Sierra On-Line Frogger 21.00*
Bluebush Chess (Your Toughest Opponent) 34.00*	Sierra On-Line Crossfire 16.00*
Broderbund Lode Runner 19.75*	SubLogic Night Mission Pinball 24.00*
C&S Goren-Bridge Made Easy 48.00*	Spinnaker Alphabet Zoo 17.00*
Epyx Temple of Apshai 21.97*	Spinnaker Delta Drawing 29.00*
Infocom Zork I, II, or III 21.50*	Spinnaker FaceMaker 20.00*
Infocom Deadline, Witness or Suspended 27.00*	Spinnaker Hey Diddle Diddle 17.00*
Microsoft Flight Simulator 27.00*	Spinnaker KinderComp 17.00*
Orion JBird (OBert Look Alike) 22.00*	Spinnaker Rhymes & Riddles 17.00*
Orion PCMan (Great Pac Man) 21.00*	Spinnaker Story Machine 20.00*
Scarborough Mastertype 27.00*	Spinnaker Most Amazing Thing 23.00*
Screenplay Asylum (works with mono card too) 15.50*	Virtual Combinatics Micro Cookbook 21.00*

BUSINESS SOFTWARE

(Please add \$2.50 shipping and handling for each title ordered from below.)

Wholesale	Wholesale
ATI How to use MultiMate \$44.00*	Microsoft Multiplan 105.00*
ATI How to use Microsoft Word 44.00*	Microsoft Crosstalk XVI 93.00*
ATI How to use Lotus 1-2-3 44.00*	Monogram Dollars & Sense 85.00*
Ashton-Tate Friday! 156.00*	Multimate Systems Multimate V3.2 250.00*
Central Point Copy II PC 23.00*	Oasis The Word Plus 90.00*
Conceptual Instruments Desk Organizer 150.00*	Peter Norton Norton Utilities 46.00*
Digital Research CP/M-86 30.00*	Rossoft Prokey Version 3 74.00*
Digital Research PL/I Compiler 399.00*	Satellite Software WordPerfect 210.00*
Funk Software Sideways 36.00*	Softcraft Fancy Fonts 125.00*
Harvard Harvard Project Manager 215.00*	Software Publishing PFS: File 74.00*
Hayes Smartcom II 68.00*	Software Publishing PFS: Write 74.00*
Lotus Development Lotus 1-2-3 CALL	Software Publishing PFS: Graph 74.00*
MicroRim RBase 4000 260.00*	Sorcim Supercalc 3 196.00*
Microsoft C Compiler 275.00*	SPI Open Access 335.00*
Microsoft Word with Mouse—Latest Version 260.00*	Verbatim Disk Drive Analyzer 25.00*

HARDWARE

(Please add shipping and handling charges found in italics next to price.)

COMPLETE SYSTEMS

Apple Macintosh CALL
Apple Apple //c CALL
Apple Apple //e CALL
Columbia Desktop & Portable Systems CALL
Eagle Desktop PC and Spirit Portables CALL
IBM PC 2 DSDD Floppy Drives/Color Card/Mono Monitor 2,147.00* (48.00)
IBM Hard Disk 1 Floppy/10Mb Hard Disk/128K/Color Card/Mono Monitor 2,902.00* (62.00)
Sanyo MBC 550 "Lowest Cost MS-DOS System" 710.00* (15.00)
Tava Complete IBM compatible (128K/Color Card/Mono Mon/2 drives) 1,710.00* (36.95)
Texas Instruments Professional CALL

DISK DRIVES & CONTROLLERS

Cogito 1/2 Ht Low Power 10MB Winchester W/IBM Controller 620.00* (18.00)
IBM Floppy Disk Controller 150.00* (2.50)
Maynard WS-1 10MB Internal Hard Disk with Sendstar Multi Function Card 960.00* (20.75)
Maynard WS-2 same as WS-1 but with Sandstar Floppy Controller (uses 1 slot) 185.00* (2.50)
Maynard Floppy Controller/Serial Port 300.00* (6.92)
Panasonic Half Height DSDD Drive Pair 350.00* (7.00)
Qume Half Height DSDD Drive Pair (Same as used on IBM Portable) 172.00* (4.00)
Tandon TM100-2 Full Height DSDD Drive 2,600.00* (46.20)
Tallgrass 20MB External Hard Disk with Tape Backup 300.00* (7.00)

MEMORY CHIPS

All chips guaranteed for life.

64K Memory Upgrade Kits (9 Chips) 43.20* (1.00)
64K Dynamic Ram Chips (Each) 4.80* (1.00)

MODEMS

Anchor Mark XII LOWEST PRICE 1200BPS 230.00* (5.00)
HAYES COMPATIBLE EXTERNAL MODEM 160.00* (3.60)
Hayes Smartmodem 300 366.90* (2.50)
Hayes Smartmodem 1200B with Smartcom II 299.00* (2.50)
Hayes Smartmodem 1200B without software 335.00* (8.50)
Rixon R212A Stand Alone 1200BPS U.S. Robotics Password (Compact 1200BPS External) 290.00* (6.50)

MONITORS

Amdek Video 300G Composite Green 110.00* (3.00)
Amdek Video 300A Composite Amber 120.00* (3.00)
Amdek Video 310A IBM Type Amber 130.00* (3.00)
Amdek Color II+ RGB Color 362.00* (6.00)
Princeton HX-12 RGB Monitor CALL
Princeton MAX-12 IBM Mono CALL
Princeton SR-12 Ultra High Res RGB 245.00* (6.00)
Taxan 210 Combo RGB/Composite 400.00* (9.30)
Zenith ZVM-123 Green High Res 76.00* (2.50)

(Consumer Reports Rated Best Buy!)

MULTIFUNCTION CARDS

Apparat 512K Memory Board with OK 65.00* (2.50)
Apparat Combo II w/ser/par/game/clock/stwr 123.00* (2.50)
AST Six-Pack Plus with OK 205.00* (2.50)
AST MegaPlus II with OK 205.00* (2.50)
AST I/O Plus II 105.00* (2.50)
AST Serial/Parallel/Game Port options for any AST Card 33.00* (1.00)
Quadram Improved Quadboard 384K with OK 197.00* (2.50)
Quadram Quadlink (Run Apple Code on IBM) 405.00* (2.50)
Tecmar Captain Multifunction Card with O/K 200.00* (2.50)

PRINTERS

Comrex/Brother CR-II 13CPS LQ Printer 399.00* (8.62)
Comrex/Brother Typewriter Keyboard for CR-II 150.00* (3.25)
Comrex/Brother Cut Sheet Feeder for CR-II 160.00* (3.89)
Epson RX-80 267.00* (6.00)
Epson FX-80 415.00* (9.25)
Epson FX-100 600.00* (14.35)
Epson LQ1500 CALL
Epson IBM-to-EPSON Parallel Cable 21.00* (1.00)
NEC 2050 20CPS Letter Quality Printer 765.00* (16.53)
NEC 3550 33CPS Letter Quality Printer 1,460.00* (31.54)
Okidata ML92P 160CPS 80 Col Printer 395.00* (8.55)
Okidata ML93P 160CPS Wide Platen 855.00* (15.00)
Okidata IBM-to-Okidata Parallel Cable 20.75* (1.00)
Qume Sprint 11/45 45CPS Letter Quality 1155.00* (24.00)
Qume IBM Cable and Interface (required) 72.00* (1.00)
Texas Instruments 855 DP/LQ w/Tractor 716.00* (15.50)
Toshiba P-1351 160/100 CPS Draft/LQ Printer 1,425.00* (32.00)

VIDEO CARDS

Hercules Monochrome Graphics Card 300.00* (2.50)
Hercules Color Card with Parallel Port CALL
Persyst Monochrome Display Card 206.00* (2.50)
Quadram Quadcolor I Color Card 175.00* (2.50)
STB Graphix Plus 240.00* (2.50)
STB Color Option for Graphix Plus 30.00* (1.00)

ACCESSORIES AND SUPPLIES

Brand Name DSDD Diskettes 20.00* (1.00)
Guaranteed for Life!!
Curtis PC Pedestal II 54.00* (3.00)
Keytronic KB5151 Deluxe IBM Keyboard 166.00* (4.00)
WP Printer Paper 2600 Sheets 17.00* (10.00)
Microline Perfs (Invisible when torn)

*PC NETWORK Members pay just 6% above the wholesale price, plus shipping. All prices reflect a 3% cash discount. Wholesale prices fluctuate rapidly—all prices in this issue have been prepared 60 days in advance. Please call for latest prices. Minimum shipping 2.50 per order.

This Month's Featured Products

COMPLETE IBM™ PC SYSTEMS—

IBM PC STARTER SYSTEM

IBM PC w/64K

(256K System Board Capacity)

\$2,147.00* (48.00)

Floppy Drive Controller
2 Double Sided Double Density 320/360K Disk Drives
Quadram Quadcolor I Color Adapter Card
Zenith ZV123 High Res Monochrome Monitor

The NETWORK has the perfect starter system for you! The combination of double sided disk drives and a color card enable you to run ANY program—from games and educational software to the most sophisticated business applications.

IBM PC PROFESSIONAL HARD DISK SYSTEM (XT)

IBM PC w/128K

(256K System Board Capacity)

\$2,902.90* (62.00)

1 Double Sided Double Density 320/360K Disk Drive
Quadram Quadcolor I Color Adapter Card
Zenith ZV123 High Res Monochrome Monitor

w/Maynard Electronics WS-2 Hard Disk Subsystem:

Combination Floppy/Hard Disk Controller. (Uses only one PC slot)
Automatic Hard Disk Boot Feature
10Mb Hard Disk (1½ TIMES FASTER THAN IBM's)

This system increases productivity in any business or professional situation. The 10Mb hard disk eliminates cumbersome floppy disk changes, simplifies operations and dramatically speeds program execution time. The NETWORK's buying power provides you with better than XT performance at a price lower than you'd expect to pay for a standard PC.

Custom Configurations

SEND US YOUR PC AND WE'LL BUILD IT FOR YOU—We offer this unique service to our members who wish to upgrade their existing IBM PCs with memory, new drives and other components purchased through the NETWORK. Simply send us your PC and for a flat fee of \$150 (plus shipping), our technical experts will integrate and completely test all new and existing components. THE NETWORK MAKES IT WORK!

YOUR SYSTEM EXACTLY AS YOU WANT IT—With the NETWORK'S over 20,000 hardware and software products we can configure a system to your exact specifications ALL AT JUST 8% ABOVE THE DEALER WHOLESALE PRICE! Ask our trained consultants about any drive, monitor, multifunction card or any other component which will meet your unique requirements.

Upgrades and Supplies

64K RAM Expansion Kits (9 Chips) GUARANTEED FOR LIFE!

\$43.20* (1.00)

**Multifunction Card

\$125.00* (2.50)

Includes serial, parallel, game port, clock, and software

**RAM Expansion Card/OK

\$85.00* (2.50)

Add up to 512K add'l memory.
Can be combined with above card in one PC slot!

**Brand Name Diskettes

\$20.00* (1.00)

DS/DD (box of 10)
GUARANTEED FOR LIFE!

**Letter Quality Paper

\$17.00*

(box of 2600 sheets)
Microfine perforations invisible when torn
SHIPPED FREIGHT FREE!

*PC Network Members pay just 8% above the wholesale price plus shipping. All prices reflect a 3% cash discount. Wholesale prices fluctuate rapidly, all prices in this issue were prepared 60 days in advance—please call for latest prices. **PC Network occasionally omits manufacturer's names or product wholesale prices because our prices are so low that we've been requested not to print them!

†RENT BEFORE YOU BUY—Members are eligible to join PC NETWORK's Business and Game Software Rental Libraries for a much smaller fee than other software rental services. And PC NETWORK's rental charges are far less—just 20% of the Members WHOLESALE PRICE.

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships only)
In Illinois call (312) 280-0002 validation code W281

Copyright ©1984 PC NETWORK INC.

America's Number 1 Computer Buying Service Brings You These 15 Exclusive, Money-Saving Benefits . . .

Join PC NETWORK for as low as \$8 for one year (or \$15 for two years) and receive all these exclusive, money-saving benefits:

1 COST+ 8% PRICING—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

2 OUR 400 PAGE WHOLESALE CATALOG—Members receive our 400 page wholesale catalog containing over 20,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. THE NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY—ALL PRICED AT 8% above Dealer WHOLESALE.

3 EXPERIENCED CONSULTANTS—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possess in excess of 150 man years of personal computer product experience. **We back our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—OR IS INCOMPATIBLE WITH YOUR SYSTEM—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.**

4 IN-STOCK INSURED FAST HOME DELIVERY—The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVERNIGHT SERVICE IS AVAILABLE ON REQUEST.

5 FREE TECHNICAL SUPPORT—The NETWORK supports every product it sells. We maintain a qualified TECH-SUPPORT staff to help you assemble your system, interpret vendor documentation and get your software and hardware to work. **WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!**

6 OPTIONAL BUSINESS RENTAL LIBRARY—All members can join our BUSINESS RENTAL LIBRARY for just \$25 PER YEAR above the base membership fee. **This entitles you to rent business software AT JUST 20% of the DISCOUNTED PRICE FOR A 12 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 21 DAYS for just \$30 above the V.I.P. base fee, this also includes the game library privileges for a \$5 combination savings.**

7 OPTIONAL GAME SOFTWARE RENTAL LIBRARY—The Game Rental library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

8 SPECIAL SAVINGS BULLETINS—THE PRINTOUT—The NETWORK seeks every opportunity to save money for its members. We buy excess dealer inventories, and store bankruptcy closeouts regularly. We then turn around and make this merchandise (only top quality name brand products) available to our members at fantastic savings via THE PRINTOUT, our newsletter and savings bulletins.

9 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

CALL TOLL FREE

1-800-621-S-A-V-E

In Illinois call (312) 280-0002

Your Membership Validation Number: W281



You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD or AMERICAN EXPRESS. Our knowledgeable service consultants are on duty Mon-Fri 8 AM to 7 PM. SAT 9 AM to 5 PM CST.



PC NETWORK
320 West Ohio
Chicago, Illinois 60610

Call now...Join the PC NETWORK
and start saving today!

The following
corporations and
respected institutions
are already
NETWORK Members:

AT&T
Barclays International
Bell & Howell
Borg-Warner
Carpetland U.S.A.
CENTEL
Citibank
Columbia University
Cornell University
First Interstate Financial
GATX Corporation
General Mills
Harvard University
Intel
Iowa Farm Bureau Insurance
National Opinion Research Center
Northwest Industries
Northwestern University
Standard Oil of Ohio
University of Chicago
University of Illinois
Veteran's Administration Hospitals
Yale University
Zurich American Insurance

. . . And thousands of satisfied Consulting Firms, Small Businesses, Large Municipalities, Government Agencies and Valuable Individuals ACROSS THE NATION!

PC Network's Try-Before-You-Buy Software Evaluation Service is the Ideal Way to Avoid Costly Errors in All Your Software Purchases!

SPECIAL V.I.P. MEMBERSHIP

A limited number of PC NETWORK V.I.P. Memberships are available at just \$15 for one year or \$25 for two years.

V.I.P. Members receive additional benefits:

1. FIRST PICK ON "BELOW WHOLESALE" SPECIALS—V.I.P. Members are given preference in the purchase of any "below wholesale" merchandise specials as featured in the "PRINT-OUT" where only limited quantities are available. Whether it be 75¢ diskettes or \$3 chips, V.I.P. Members often earn back the membership cost difference the first time they exercise this option.

2. V.I.P. SAVINGS ON SOFTWARE RENTAL LIBRARIES—All V.I.P. Members are eligible to join our Business AND Game Software Rental Libraries for just \$30 per year in addition to the basic V.I.P. membership fee. All the same conditions apply to the V.I.P. Libraries as the Basic Membership Libraries.

3. EXTENDED V.I.P. RENTAL PRIVILEGES—V.I.P. Members can enjoy their rented merchandise longer . . . a full 21 days instead of the twelve days allowed with our Basic Membership.

10 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

11 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users (see box at left). The NETWORK can establish open account (P/O) status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

12 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors. **The NETWORK looks for every opportunity to save you money.**

13 SOFTWARE PUBLISHING ASSISTANCE—The NETWORK reaches tens of thousands of members regularly through its catalog and newsletter. For those of you who have created marketable software we will lend you our clout with our members, software publishers and distributors to get your material evaluated and circulated.

14 MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

15 PRODUCT SATISFACTION GUARANTEE—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.



Advancing the technology of data security

Introducing Data Sentry.[®] Computer security so advanced, even Mata Hari couldn't hack it.

Your most confidential files may be easy prey for the advances of an artful hacker.

That's why Lockheed used its years of experience with high-technology systems to create Data Sentry.

Protection for sensitive data

Its own internal computer gives you the telecommunications features of an intelligent modem. But unlike other modems, Data Sentry is smart enough to keep your secrets from the most persistent computer intruders.

Data Sentry puts an electronic wall around both large and small computers. And because its protection is external to your CPU, it can eliminate the expense of internal security software. It blocks the inquiries of would-be Mata Haris with a sophisticated security sequence.

Security for every situation

First, Data Sentry requests the phone number of a caller desiring access to your computer. Then it hangs up the phone and searches its list of authorized phone numbers. If the caller's number is authorized, Data Sentry dials the caller back and requests entry of a password. If the correct password isn't supplied within three tries, Data

Sentry disconnects and will not return further calls from that phone number.

Data Sentry also lets users select other lower levels of security if desired, including callback to any number with entry of password. And an option, Remote-ON[®], lets you turn your computer's power on and off from a remote terminal after security has been cleared.

Versatile and confidential

Data Sentry logs all attempted contacts for audit trails and analysis of users. Its security set-up is locally controlled by a master password that is accessible only to authorized personnel. And its design includes high-reliability components, the latest LSI circuitry, plus Autodial 300/1200 baud full-duplex communications, with auto ranging for incoming data.

Data Sentry will deal with your toughest security problems.

And it'll never fall for just a pretty face.

For a list of your nearest Data Sentry distributors, call toll-free 1-800-443-0100, Ext. 471. Or write: Lockheed GETEX, Suite 945, 1100 Circle 75 Parkway, Atlanta, Georgia 30339.



 **Lockheed-GETEX**
Leadership in Technology

Circle 102 on reader service card

The New Political Machine

Jonathan Littman



There's a new breed of campaign worker in politics this year. This tireless employee is dedicated to churning out hundreds of fund-raising letters, keeping tabs on scores of mailing lists, calculating budgets and salaries, complying with financial reporting requirements, managing schedules,

collecting intelligence on any number of issues (and opponents), and sorting through hundreds, perhaps thousands, of supporters.

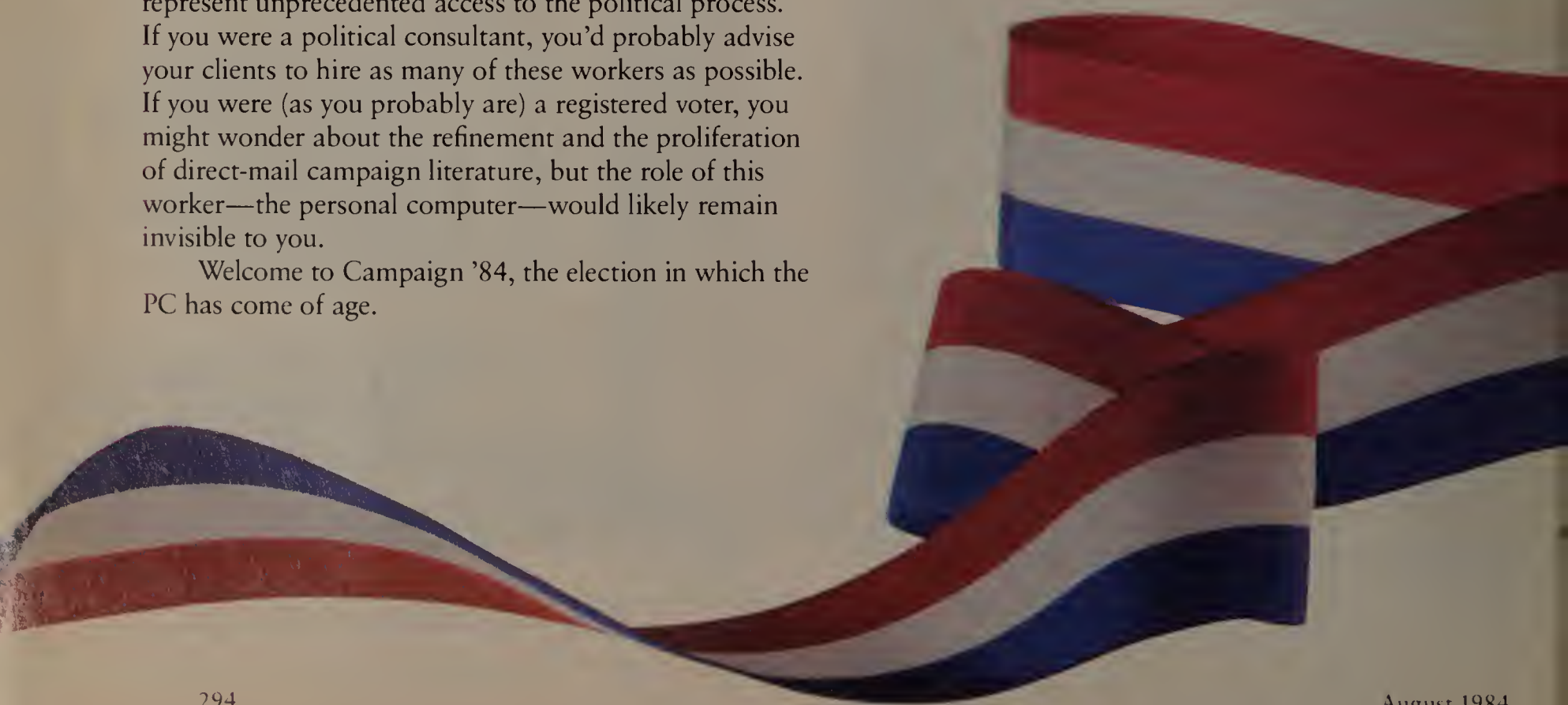
If you were a candidate, you'd surely want as many of such workers as you could find; such an asset could represent unprecedented access to the political process. If you were a political consultant, you'd probably advise your clients to hire as many of these workers as possible. If you were (as you probably are) a registered voter, you might wonder about the refinement and the proliferation of direct-mail campaign literature, but the role of this worker—the personal computer—would likely remain invisible to you.

Welcome to Campaign '84, the election in which the PC has come of age.

Coming a Long Way

In 1952, when one computer filled an entire room, a Univac correctly predicted the outcome of the presidential race. In the more than 30 years since, computers have shrunk, but their role in politics has grown enormously. Suddenly mainframes have company on the soapbox; small computers like the PC are grabbing an ever-increasing share of the work load.

Mainframe computers have traditionally handled large assignments for national campaigns. GOP fund-raising guru Richard Viguerie pioneered mainframe-based political mass mailings during the mid-1970s, and the Republican National Committee bought its own mainframe in 1975. Now, as the PC becomes entrenched as a campaign tool, it's helping to place less well-heeled challengers on a more equal footing with incumbents. Until very recently, only the big machines were capable







of performing the brutal clerical chores that once occupied scores of volunteers and bringing the organizational techniques of far larger campaigns to the thousands of state and local elections that take place every year.

At the presidential level the micro is used for its combination of computing power and mobility, an essential mixture during primary season. Walter Mondale's campaign staff added Kaypro computers to its entourage, while Gary Hart and John Glenn put IBM PCs to work in their bids for the White House.

Political strategists agree that lists are the organizational heart of every campaign. The lists represent people—contributors, volunteers, supporters, potential swing votes—who make the difference between triumph and defeat. These lists, once confined to index cards, are now grist for the PC's mill as campaigns translate scattered information into data bases via *dBASE II* and similar data management programs. Then, relying on word processing and mail-merge programs, this vital data becomes fuel for fund-raising appeals or issue-related mailings. Campaigns are also businesses, limited by time and place—and electronic spreadsheets are helping to manage the business side of politics.

The proliferation of PCs in political campaigns is motivating software developers. Even as campaigns adapt and refine such popular programs as *WordStar* and *1-2-3*, political consultants turned software developers are releasing packages that simplify the myriad chores of campaigning.

An Inauspicious Beginning

Winning a spot on the campaign team has not been easy for the personal computer. In 1982, when PCs were hitting the political trail for the first time and the personal computer industry was still in its infancy, there was good reason for skepticism about its political future. The experience of one Florida representative is instructive.

Bernie Friedman, administrative assistant to Florida Congressman Larry Smith, recalls that his boss was apprehensive about Friedman's idea of working a personal computer into Smith's campaign for the 16th district seat. Says Friedman, "His initial reaction was something like, 'What do we need that thing for?'"

At first Smith's intuition seemed correct. The Exxon 520 and accompanying software didn't perform as promised. When Friedman and his staff finally got the system to work, they discovered that the crude, excessively technical programs were over their heads. But just when things were beginning to look bleak, Smith's teenage son took the Exxon manual home. In a few days he and his

You Can Automate City Hall

Alexander Beshar

In San Francisco, perhaps more than in most major urban centers, high technology has taken hold. The stevedores of yore have given way to systems analysts and other white-collar types who work in newly sprouted skyscrapers, blocks from abandoned piers.



Dianne Feinstein, the city's two-term mayor, has become an unofficial ambassador on behalf of Silicon Valley, which sprawls across former prune orchards 35 miles south of San Francisco. Silicon Valley is now a favored destination of visiting heads of state, including Queen Elizabeth of England and President François Mitterand of

France. Mayor Feinstein has accepted with enthusiasm her role as informal host.

As the leader of a city on the "Pacific Rim"—the border of land on both sides of the Pacific that is the site of many emerging North American-East Asian economic partnerships—Mayor Feinstein is in a unique position to view how high technology overlaps international trade and how those matters, in turn, mesh with issues central to America's cities.

The scene on a recent spring morning was typical. The mayor welcomed a group of NEC (Nippon Electric Company) executives, headed by company Chairman Kobayashi. She presented Kobayashi with a key to the city in recognition of a computerized fingerprint identification system that

NEC manufactured for the San Francisco Police Department. The culmination of 12 years of R and D, the system is the second of its kind to be installed in the world. With NEC technology in place, the time needed for fingerprint searches can be compressed from months to minutes.

The mayor's microelectronic forays are not limited to acting as high-tech guide to the powerful and influential. Unlike so-called "Atari Democrats" Gary Hart and Jerry Brown, who advocate high technology as a means of revitalizing the American economy, Mayor Feinstein's reliance on technology is more prosaic, for small computers have definitely found a home at City Hall. For the business of running the city, Mayor Feinstein is a dedicated "Wang Democrat." When the Feinstein political campaign apparatus is in motion, she's an "IBM PC Democrat." Indeed, she achieved a resounding reelection last November abetted by a campaign staff versed in *dBASE II* on the PC.

Eric Jaye, spokesman for Clint Reilly Campaigns, the organization that managed Mayor Feinstein's 1983 reelection bid, says that the campaign relied on several PCs for a variety of chores, including managing lists, maintaining a data base of organizers, and conducting several mailings of 500 letters each. PCs have also assisted in the more mundane electoral tasks of billing, handling invoices, and keeping the books. "Computers have been essential in political life for seven or eight years," says Jaye, "but the PC is only now filtering into headquarters as a visible part of the campaign."

(continues)

friends had designed a system for the campaign. It was summer, and the kids gladly spent their days taking turns on the computer, churning out the letters needed to raise money for television commercials.

Everything was fine until school resumed. Then, with the primary coming up, the Smith campaign became desperate for technical—and in this case youthful—assistance. Friedman remembers a hectic September day when his staff had to retrieve the campaign's head hacker from class; he alone knew how to get the letters rolling. Enlisted again, the kids resumed spending free

hours at the headquarters. On one particularly frantic night a mother called, demanding that her child come home for dinner. Friedman refused to let him, knowing that the 16-year-old was the only one who could do the job. Although angered, the mother eventually relented and brought her son's dinner to the office.

You Can Automate City Hall (continued)

For a political consultant like Jaye and his staff, the PC means liberation from drudgery. And that can mean a leaner, more effective campaign. "Time is the number one constraint in politics," Jaye notes. "We've found personal computers to be extremely useful in doing things that were once done by hand. The PC lets us increase person-to-person campaigning, freeing volunteers to get out on the street." In the mayor's case the PC helped organize a volunteer corps of 2000—the largest such assemblage in the city's history, Jaye claims.

Jaye prefers standard PC software to programs packaged with politics in mind. "We didn't know anything about computers when we got our first PC, but we played with it and taught ourselves," he says. "We found *dBASE II* easy to learn. We're using a number of programs now." For Mayor Feinstein the proof of the PC's power is in the printouts—and at the polls.

PC World Chairman and Publisher David Bunnell recently spoke with Mayor Feinstein about personal computing and politics. The mayor's bright, spacious, ornately paneled City Hall office is festooned with San Francisco memorabilia. Large windows overlook the bustling Civic Center plaza. A bust of George Moscone, her late predecessor, stands in a corner by the window.

David Bunnell: PC World is examining how the proliferation of the personal computer may be changing, even opening up, the political process. How has microcomputing been a benefit to your campaigns?

Mayor Feinstein: I think that personal computing gives those of us in office the ability to have what we call a "house-sign" list—a volunteer list—of the sort that used to be kept on cards, until someone would invariably walk out with all the cards and we'd lose everything. Now it's all stored in computer memory. And data has become, on a mundane level, virtually theft-proof—although computer operations aren't invulnerable, of course.

I think that a sophisticated approach to microcomputing is important to San Francisco. This is, after all, a vital research and development center. The computer industry is and will continue to be a major job base for our people. Training people to become skilled in data entry, hardware design, and programming tasks—in short, all of those things that are integral to computer operations—really ensures a continuing supply of jobs for our youngsters. That's why we in San Francisco are increasing computer-related training in our elementary and secondary schools, vocational centers, and community colleges. We are predominantly a white-collar city, yet we need blue-collar jobs. The blue-collar jobs that accompany the industry's white-collar positions are critical for us.

Bunnell: Chairman Kobayashi of NEC was recently awarded a key to the city. Are you concerned about competition from the Japanese, and how do you see it affecting the development of the domestic computer industry?

Feinstein: I think that competition is healthy. Frankly, I think that what is not healthy is protecting against competition, because to do so is generally to admit to mediocrity. The Japanese have taken imitation and turned it into innovation. Mr. Kobayashi's company has been working for 12 years in cooperation with the National Police of

Presidential Programs

Although campaigns remain labor-intensive, PCs are enabling organizations to limit the drudgery and give staffers assignments that are meatier than letter writing and envelope stuffing. And in the heat of the campaign, necessity is breeding a lot of invention. Staff members are coming up with innovative ways of putting hardware and software to work.

Consider Colorado Senator Gary Hart's presidential campaign. The Hart bid took to personal computers out of financial need. Before the New Hampshire primary catapulted Hart to national prominence, his organization was starved for cash. Hart staffers devised a means of

acquiring computing power without a major investment; they prevailed upon supporters in key states to lease their PCs to the campaign at market value. PCs thus joined the Hart campaign for the duration to supply needed mailing and accounting assistance.

Back in Washington the Hart campaign used a Compaq to manage a potentially ticklish situation. Hart's New England victories brought extensive media coverage, and that meant chartered planes brimming with journalists. Since the Hart organization had no effi-

Japan to develop the fingerprint system. They spent time, made a commitment, and wanted to perfect the product. In my opinion, this is what we must do more of in America.

America's know-how is as good, if not better, than Japanese know-how. But I think that we sometimes take the consumer segment of our population for granted. We think that people are going to buy American even if it means that the product is more expensive. But people don't "buy American" by rote. Detroit learned this, and every industry in America is now learning this. The answer is to be competitive, to aim for the state of the art, and to aim for excellence and quality. Then people will respond.

Bunnell: What can you do to encourage these things?

Feinstein: Well, I try to speak out as much as I possibly can. I believe in free and open trade. I don't believe in tariff restrictions. I believe in exchange of information. We're entering the century of the Pacific. By the year 2010, according to estimates, 60 percent of the world's population will be living on both sides of the Pacific Ocean. This means that this ocean, which has been used as a barrier and as a theater of war, will become a vast telecommunications superhighway. The opportunity for Pacific Rim nations to become developed, to become a part of this expanding computerized world, is profound. San Francisco is the gateway to this activity, since we are the center of much of this trade and commerce. We view this as a very fortunate and essential role to play.

cient way to bill news agencies for costs incurred flying reporters around the country, the campaign was, according to Technical Operations Director Dave Masselli, "extending credit to CBS, ABC, and NBC" (hardly an idle concern considering that the candidate's high campaign costs led him to mortgage his house).

Using 1-2-3 on the Compaq, an accountant wrote a series of programs that enabled the campaign to bill newspapers and TV networks for current charges. This adjustment alone added \$18,000 to the Hart coffers. The campaign also used the Compaq for general billing and accounts receivable tasks.



Community

John Glenn's abortive bid for the presidency similarly put 1-2-3 through its paces. Nine months into the Glenn campaign, a budget analyst suggested bringing in three PCs equipped with 1-2-3 so he could keep "control" of things. In addition to basic accounting and budgeting, the PCs helped with "follow-up." "When there was a particular event, we'd take down names, enter them into the PC, and later print out thank you letters," says office manager David Brant.

Hitting the Target

Launching a barrage of letters is only one part of running a campaign, of course. Applications ripe for the PC also include polling, targeting groups of voters, and complying with state and federal campaign financial reporting requirements. Campaigns are doing these jobs with off-the-shelf spreadsheet software, newly customized programs, and packages created expressly for office seekers.

Targeting. Targeting voters is a candidate's way of efficiently allocating time and energy by determining how demographics affect votes. The PC is helping campaigns compile histories of relevant past elections, from which strategists can attempt to predict voter behavior. This is accomplished by entering precinct data into a

Although the marriage of PCs and political campaigns was made in Washington, it's being nurtured this year at the grass roots level.

VisiCalc or 1-2-3 spreadsheet. Using the program's basic calculations, campaign officials can determine a given precinct's mix of Republicans and Democrats. Sophisticated targeting techniques examine precincts on such criteria as voter turnout, past voting trends, and the intensity of support for other candidates.

Polling. Although the marriage of PCs and political campaigns was made in Washington, it's being nurtured this year at the grass roots level. Polling is a case in point. Surveying the electorate has traditionally been too costly for local candidates. Equipped with the right software, however, the PC is automating—and making accessible—the polling process.

Once a campaign has selected an area that it wants to canvass, a polling program generates random telephone numbers that have the appropriate prefix. Cam-

paign officials refine the sample; volunteers then call the numbers and ask a series of multiple-choice questions.

The program analyzes poll results by culling similar responses to selected questions. This cross-tabulation is known as "identifying response groups" and helps candidates determine their standing among various constituencies. Although polling by PC isn't likely to replace Gallup or Harris, it is providing state and local candidates with quick, low-cost surveys.

Financial reporting. Furnishing state and federal authorities with current campaign finance data has evolved into a virtual cottage industry for political campaigns. *CRS: The Campaign Reporting System* from Poynor Computer Applications is one package aimed at satisfying those filing requirements. The program enables campaigns to provide periodic information on pledges, contributions received, loans received and made, and accrued expenses. Because the system keeps extensive records of all these elements, data can be prepared directly for campaign disclosure reports and used in day-to-day campaign management.

Software to Run With

While some campaigns enlist such workhorses as *WordStar*, *dBASE II*, and 1-2-3, others are choosing from an array of packages with a distinctly political slant.

Solon, from Q Systems Research Corporation, is among the most elaborate and expensive offerings. The manufacturer claims that *Solon* provides a complete PC-based political package: hardware, software, and political consulting by Thomas Dackow, the firm's president. *Solon's* \$16,000 price tag buys a PC XT with 256K; a Hayes Smartmodem 1200; a Qume letter quality printer; a Ziyad sheet feeder; an IBM Graphics printer; Tecmar's Captain board with 384K RAM, clock, and serial and parallel ports; specially adapted versions of 1-2-3, E-COM, and IUS's *General Ledger* and *Accounts Payable* packages; and *Solon* proprietary software.

For campaigns that aren't that well-heeled, a number of political packages are available for less than \$1000, among them *Campaign Manager*, *Politech 1*, and *dCAMP*. The *Campaign Manager* story illustrates how politics and technology can converge. Undaunted by managing two failed congressional bids, brothers John and Dean Phillips—political strategists with programming expertise—devised a \$499 program that they claim can perform a number of campaign tasks. The Phillips brothers say that *Campaign Manager*, now marketed by Aristotle Industries, will monitor budgets and financial reports for state and federal agencies. It also contains modules designed to help campaigns handle advertising, press relations, scheduling, fund-raising, targeting, and

All in the Family



Jeff Carter and his father, former President Jimmy Carter, at COMDEX

UPI

Jeff Carter is no stranger to political life. As the son of former President Jimmy Carter, he grew up in the public eye, and he continues to work on behalf of political causes. But the younger Carter brings programming skills, not oratory or analysis, to the process. In a sense Jeff Carter and his brother Chip symbolize the growing relationship between candidates and

computers. Both are combining their interest in politics and their talent for technical subjects.

In 1978, while pursuing a degree in geography at George Washington University, Jeff learned of a federal project to combine Census Bureau data with information from the National Oceanographic and Atmospheric Administration (NOAA). Relying on a mainframe, the project sought to display population data in map form. Budgetary problems arose, however, and support for the program diminished.

Carter's interest in the concept didn't wane when NOAA shelved the project. Shortly after IBM released the PC, he went to work on a PC-based software package that could do most of what the Census Bureau/NOAA collaboration promised. *Statmap* is the result, and this year Jeff Carter's pet project went commercial. The program gives candidates and their advisors an opportunity to view demographic data superimposed on a national or state map. The Reagan reelection campaign was reportedly among the first buyers. Rumor has it that Walter Mondale's staff also bought a copy.

William Myers, marketing support manager for the program, describes *Statmap* as a presentational tool. "Data shock—characterized by piles of data that you can't understand—is prevalent in campaigns. A visual tool like *Statmap* gives you control over the data," he says. Although the program is being used in the presidential race, he regards *Statmap* as a boon to candidates at all levels.

Myers has a simple theory about why the package is catching on. "Politicians are some of the least analytical people around; calculators even took time to enter the political arena," he says. "Politicians are accustomed to working on a personal basis. You won't get them to use software by devising gimmicks like a touch screen or a mouse. You've got to develop software so easy to use that politicians can 'see' its value."

Today, politicians can "see" the United States or France on *Statmap*. Eventually Carter hopes to create digital maps of the entire world.

While Jeff Carter was writing programs for politicians, his brother Chip was punching the keys of an IBM PC XT on behalf of Walter Mondale. As Mondale's deputy coordinator for 16 southern states, Chip was a key operative during the so-called "Super Tuesday" primaries in Georgia and Alabama—states that were big wins for Mondale.

PC World contacted Carter on the eve of the Georgia vote, briefly tearing him away from the XT where he was preparing to dispatch another 600 letters. Carter stopped just long enough to offer his impression of the impact of personal computers on campaigns. "Computers," he said, "are the biggest thing to hit politics since television."

polling. Introduced in the spring of 1983, *Campaign Manager* hit the campaign trail well ahead of most of its competitors. More than 1000 copies of the program have been sold, including three to Democratic presidential hopefuls.

For at least one member of Congress, *Campaign Manager* has been a decided plus. Representative Buddy Darden (D-Ga.), successor to the late Representative Larry MacDonald—killed when Korean Air Lines flight 007 was shot down—relied on the program in his race against MacDonald's widow, Kathleen.

John Thomas, Darden's political consultant, brought a PC and an Apple IIe into the campaign, then selected software. Thomas describes *Campaign Manager*'s role in the Darden bid as that of a tool, not a panacea. "In one sense, running a campaign is nothing more than organizing a tightly run business in a ridiculously short length of time," he says. "The computers and the software helped us use our time more efficiently."

Community

Thomas put lists of all supporters and contributors into the *Campaign Manager* master file, then had the contacts grouped by geographic area. The PC did all the sorting and classifying—the kind of grunt work formerly done by volunteers. “Because we could see where our support was, we were able to discover where we were weak and where we needed to concentrate our efforts,” Thomas says.

The program helped bring order to the chaos that often characterizes a campaign office. “When Buddy was invited to a function, we would immediately use the scheduling program to call up his schedule on the screen and confirm the appointment on the spot,” Thomas explains. Using the PC also seemed to improve the Darden organization’s efficiency in communicating with voters. When someone expressed interest in the candidate or re-

In 1982 only 9 of Tobe’s 52 principal clients used personal computers. This year 35 of 60 are relying on micros.

quested his position on an issue, a staff member would immediately dispatch a letter of thanks for the inquiry. “In prior years we would have gone to a mainframe,” Thomas says. “We would have dealt with higher costs, longer turnaround time, and letters that would not have been as personal.”

By election day, staff members were working on the PC in three shifts. Their high-tech approach helped generate contributions of \$320,000 in just nine weeks. Thomas is currently applying *Campaign Manager* to in-house polling and financial contribution monitoring chores.

Shaking Hands with Politech 1

Some political consultants tout *Politech 1*, from Politech Limited Partnership, as an even more versatile package. *Politech 1* is the brainchild of WordCom, a national mail-order house, and Analysis Group, a political polling and research firm. The principals of Analysis Group earned their credentials as pollsters and list managers for Senator Chris Dodd (D-Conn.) and for the presidential campaigns of Robert and Edward Kennedy. According to its designers, *Politech 1* compresses a \$15,000 mainframe-

size system into a program for the PC. For example, *Politech 1*’s voter-targeting module enables you to enter up to four years of election data, then cross-tabulate the results according to various demographic categories (age, race, sex, and income). The package also includes modules for list management, budgeting, media management, polling, and logging campaign activities.

Politech 1 and the PC are currently hard at work in Nebraska. As part of a project to create a statewide data base of voters and contributors, the Nebraska Democratic party has placed micros in the field and an IBM PC XT and System/36 at headquarters. Because Nebraska lacks a consolidated voter list, party volunteers are canvassing each county for voter registration information. They are then entering their findings, plus election histories and demographic data, into the party’s PCs, which are equipped with *Politech 1*. This information, in turn, is sent by modem to the XT and finally to the System/36.

Marg Slominski, executive director of the Nebraska Democratic party, is encouraging local Democratic candidates to use the system. For now, list management entails moving files between the XT and the System/36 at state headquarters. With the addition of *Politech 1*, however, Slominski feels that computerized list management will be available at the local level, and she suggests that candidates in the lesser contests will soon be able to do their own targeting as well. Slominski also views *Politech 1*’s media management and campaign budgeting modules as a boon for local races. The media management component analyzes the costs and benefits of prime-time radio and TV advertising.

Politicians aren’t procuring PCs and political software just to get elected; computers are also helping solons stay in office. For veteran California Assemblyman Louis Papan, a Democrat from suburban San Francisco, *Politech 1* has become part of a process that appears to have no end. “When you’re an assemblyman and you’re up for reelection every two years, it seems like you never stop running,” says Pat Sweetland, Papan’s field representative. Papan is using the PC and *Politech 1* for basic list management, voter contact, and financial record keeping.

It is *Politech 1*’s talent for offering multiple views of contributors that Sweetland is finding especially useful. He’s been using the program to examine the donor lists of the Papan campaign. On the PC he can rank contributors by size of gift, rank contributions by their source, discover the kinds of functions that elicit the most support, and discern the professions or groups that tend to donate to the campaign.

dCAMP, from PoliComp Associates, is a new package tailored for political campaigns of modest size. It consists of five modules (polling, volunteer management, scheduling, voter targeting, and financial reporting) and makes use of Ashton-Tate’s *dBASE II RunTime*.

Political Programs

"Politics," an old saying goes, "is the art of the possible." A growing body of campaign-oriented software is helping political aspirants achieve the possible. Many of the packages that follow include individual modules for specific campaign tasks, such as scheduling, polling, and financial reporting.

CRS: The Campaign Reporting System

Poynor Computer Applications

6372 W. 82nd St.

Los Angeles, CA 90045

213/645-7265

List price: demonstrator kit \$50, one-committee packages \$795 to \$1495, two-committee package \$1895, each additional committee \$200

Requirements: 128K, 5MB hard disk, DOS 1.10 or 2.00

Solon

Q Systems Research Corporation

478 Morris Ave.

Summit, NJ 07901

201/522-1774

List price: \$16,000

Campaign Manager

Aristotle Industries

P.O. Box 21

Norwalk, CT 06853

203/853-6686

List price: \$499.95

Requirements: 128K, two disk drives, DOS 2.00

Politech 1

Politech Limited Partnership

31 Main St.

P.O. Box 537

Ellington, CT 06029

203/875-1234

List price: \$950

Requirements: 128K, one disk drive, DOS 2.00

dBASE II RunTime

Ashton-Tate

10150 W. Jefferson Blvd.

Culver City, CA 90230

213/204-5570

List price: \$100

Requirements: 128K, one disk drive

dCAMP

PoliComp Associates

2522 Capitol Circle NE

Tallahassee, FL 32308

904/386-5128

List price: three modules (finance, organizer, schedule) \$995, polling module (written in CBASIC) \$995

Requirements: 128K, two disk drives (hard disk drive recommended)

Statmap

Ganesa Group International

1495 Chain Bridge Rd. #300

McLean, VA 22101

800/638-2225

List price: \$995

Requirements: 128K, two disk drives, graphics adapter (RGB monitor and plotter recommended)

David Meets Goliath

The PC works well alone, but its power and flexibility increase dramatically when it is linked to a larger computer. Several major political campaigns have augmented the PC for very ambitious tasks—and have found the enhancements invaluable. So reports Frank Tobe of Below, Tobe and Associates, one of the nation's largest suppliers of direct-mail and computer services to Democratic candidates. In 1982 only 9 of Tobe's 52 principal clients used personal computers. This year 35 of 60 are relying on micros.

California Assemblyman Tom Hayden is one Tobe client whose need for mass mailings was met by a micro hooked to a mainframe. Tobe loaded his big IBM machine with names and addresses of the 300,000 registered voters in Hayden's district. He then added demographic data to this massive file in preparation for targeted mailings. Because Hayden had a personal computer at his campaign office, he was able to supply a human touch to letters. Working from notes and insights

☉ Community

gained while campaigning, he would enter pertinent voter information on the micro at headquarters, then use a communications program to telecommunicate that data to Tobe's mainframe. Letters were subsequently sent to key supporters and included additional information on issues or personal postscripts from Hayden.

The New Wave

What Al Jolson said about his act also applies to the personal computer's role in political campaigns: You ain't seen nothin' yet. That is certainly the conclusion of "Campaigns and Computers," a recent special issue of *Campaigns and Elections*, a journal devoted to the electoral process. Managing Editor Robert Abeshouse calls the personal computer "a great equalizer" in politics. "PCs bring political campaigns within the reach of many. The personal computer enables any citizen to get involved in fund-raising."

Other political observers are concerned, however, that too little attention is being paid to how personal computers ought to be used in campaigns. "You see the

Personal computers offer political campaigns more than efficiency and financial order.

same flaws in political packages that were initially present in management systems," says Earl Bender, a Washington-based political consultant. "You saw lots of clean report forms, but the designers had little understanding of how they were to be used." As a consequence, says Bender, some programs appear to be doing things that they cannot actually do. He is also wary of organizations that depend too much on even well-written software and wind up serving the machine more than the candidate. "Some campaigns begin to rely only on the computer and don't stop to apply intellect and sound management techniques," he contends.

Brian Lunde, director of the Democratic party's state-level Campaign '84 effort, looks at many PC applications and doesn't see much to get excited about. "Vendors are pitching all sorts of advanced software,

but candidates aren't using what they're pitching," he reports. Lunde estimates that the bulk of the campaigns that purchased political software are not using the media or polling modules of those programs—but suggests that such a gradual approach to automation is wise. "What candidates should be using are the modules that deal with the Federal Election Commission filing, word processing, list management, and scheduling. If they become too concerned with the *Star Wars* aspect of computing, campaigns can forget the basics—like sending a letter to an important contributor." Although his is a "go slow" approach, Lunde feels that the personal computer will inevitably serve as an electronic campaign manager for most small campaigns.

For financially strapped candidates personal computers may prove to be the only way to make ends meet. Federal and state reporting requirements have become so strict—and the cost of campaigning has risen so dramatically—that one political consultant suggests that running for office "virtually requires hiring an accountant." The PC's speed and efficiency can help in overseeing the budget, accounting, and campaign reporting.

Sam H. Kernell, a political science professor at the University of San Diego, thinks that personal computers offer political campaigns more than just efficiency and financial order. Kernell says that small computers are in keeping with the increasingly independent style of the American voter. Party loyalties are diminishing, he notes, and the rise of automation in politics is permitting candidates of all persuasions to woo voters in new ways. The Republican party, which "discovered" the political use of mainframes, may have pioneered sophisticated direct-mail and marketing approaches, but the microcomputer revolution has given computing power a small-*d* democratic flavor. Now everyone is potentially in the game. Tried-and-true strategies, as Kernell suggests, "just aren't enough anymore." ☉

Jonathan Littman is a freelance writer who works in the San Francisco Bay Area.

Lightning Service and Support through Telemarketing

Micro Flash is Reliable

- In our 4th year of business (*One of the Originals!*)
- Positive buying power within the industry meaning well-stocked inventories and a consistent supply
- A reputation as specialists in the business and corporate marketplaces
- A dedicated approach to honest customer service

Micro Flash Guarantee

- We sell the latest versions
- We support what we sell
*We won't tell you to call the publisher or manufacturer for after-sale support.
We want you to call us!*
- We won't sell you anything we don't think you need
- If the product is defective when you receive it—we'll replace it!

Micro Flash Terms

- MasterCard or VISA—with no credit card surcharge added
- Mail Orders accompanied by certified or cashier's checks
- Call our Credit Manager for information on institutional purchase orders
- All returns must have a Return Authorization Number
- \$100.00 minimum order
- Products and prices subject to change without notice

Micro Flash Shipping

- \$6.00 for UPS surface (except for printers and monitors)
- Add \$3.00 per item for UPS 2nd Day Air
- All shipments fully insured at no extra charge
- Call for information on foreign orders, US Mail, CODs
- Overnight delivery service available

HARDWARE & PERIPHERALS	RETAIL PRICE	MICRO FLASH
AST Research SixPakPlus 64K . .	\$395.00	\$269.00
64K Ram Chip Sets "\$1 per K" . . .	100.00	64.00
CDC 9409 DS/DD Disk Drive	525.00	249.00
Hauppauge 8087/8088 Chip Set . . .	225.00	199.00
Hayes Smartmodem 1200	699.00	489.00
Hercules Graphics Card	499.00	369.00
Half-Height DS/DD Drives		\$CALLS
Paradise Multidisplay Card	589.00	489.00
Printers—Epson, Oki, Diablo, NEC, Toshiba, Brother, Others		\$CALLS
Princeton Graphics		
Max-12 Amber Monitor.	249.00	189.00
HX-12 Hi-res RGB Monitor . . .	695.00	524.00
SR-12 Super Hi-res RGB Monitor	799.00	629.00
Quadram Expandable Quadboard . .	295.00	239.00
STB Graphics Plus Card	498.00	409.00
Diskettes—3M, Dysan, Others		\$CALLS

SOFTWARE	RETAIL PRICE	MICRO FLASH
Ashton-Tate dBase II	\$700.00	\$379.00
BPI Systems Accounting (ea. mod.)	595.00	398.00
Continental Home Accountant Plus	150.00	84.00
Champion Software Accounting (ea. mod.)	595.00	479.00
Financier II	195.00	159.00
Fox and Geller QUICKCODE	295.00	179.00
Microrim Inc. R:base 4000	495.00	349.00
Microsoft® Multiplan™	195.00	148.00
Multi-Tool™ Word with Mouse	495.00	348.00
Multi-Tool™ Cash Plan	125.00	94.00
Basic Interpreter	350.00	244.00
Basic Compiler	395.00	276.00
Business Basic Compiler	600.00	418.00
C Compiler	500.00	349.00
Pascal Compiler	300.00	224.00
Fortran Compiler	350.00	244.00
Cobol Compiler	700.00	518.00
Sort Facility	195.00	148.00
Macro Assembler	100.00	74.00
Microstuf Crosstalk XVI	195.00	119.00
Peter Norton Utilities	80.00	55.00
Professional WordPlus-PC with The BOSS	495.00	349.00
RoseSoft ProKey Vers 3.0	129.95	95.00
Scitor Project Scheduler	285.00	198.00
SoftWord Systems Multimate	495.00	298.00

Member: Better Business Bureau, Chamber of Commerce
Listed: Dun & Bradstreet

Many other
products available
at comparable
discounts!
Quantity
pricing available

For product
information,
price quotes,
technical support
and California
orders,
please call

415/680-1157

To order from
outside California,
call

800/458-2433



COMPUTER SYSTEMS

1110 Burnett Avenue, Suites J & K
Concord, CA 94520



COMPUTER DISCOUNT PRODUCTS

HUGE Inventories • IBM Specialists

★ ASK ABOUT OUR FAIR PRICE POLICY - IT'S GUARANTEED! ★



Epson FX-100

\$699.



CDP IS YOUR AUTHORIZED

MicroPro® DEALER



INFOTAR	269.99	SUPERSOFT	149.99
PRO OPTIONS	199.99	WORDSTAR	259.99
STARBURST/INDEX	139.99	WORDSTAR PRO	399.99

INFOCOM

DEADLINE/ENCHANTER	ea32.99
INFIDEL/WITNESS	ea32.99
PLANETFALL	32.99
SORCERER New!	37.99
ZORK I, II, III	ea24.99

Continental

FCM/1st CLASS MAIL	71.99
HOME ACCOUNTANT	84.99
PROPERTY MANAGEMENT	329.99
TAX ADVANTAGE	44.99
ULTRAFILE	144.99

IBM SOFTWARE

ALPHA Typefaces	79.99
ASHTON TATE dBASE II	399.99
Friday	179.99
Encyclopedia	59.99
BRODERBUND Loderunner	24.99
Serpentine	24.99
CENTRAL POINT Copy II PC	25.99
CROSSTALK	139.99
LIFETREE Volkswriter	119.99
MASTERTYPE	26.99
MICROLAB Miner 20-49er	27.99
MICROSOFT Flight Simulator	34.99
Multiplan	169.99
Word	259.99
Word w/Mouse	315.99
NIGHT MISSION PINBALL	32.99
NORTON UTILITIES	55.99
PC Crayon	49.99
PFS File	99.99
Graph	99.99
Report	89.99
Write	99.99
SIERRA ON-LINE Crossfire	21.99

IBM HARDWARE

KOALA TOUCH TABLET

\$95⁹⁹



1/2 Height DS/DD Drive	239.99
AST I/O Plus	119.99
Mega Plus II	265.99
Six Pack Plus	269.99
HAYES 300 Baud Smartmodem	209.99
1200 Baud Smartmodem	499.99
1200B Modem	429.99
KRAFT Joystick	44.99
Paddle	34.99
MICROSOFT Mouse	129.99
NOVATION 103 Smart Cat	169.99
103/212 Auto Cat	399.99
Access 1-2-3	469.99
PLANTRONICS Color Plus	375.99
TG Joystick	44.99
TITAN 64K Board	499.99

MONITORS

USI for IBM NEW!	\$CALL
AMDEK 310A (Amber)	\$CALL
MAX 12 (Amber) NEW!	119.99
PRINCETON RGB HX-12	485.99
TAXAN 420 RGB	499.99

DISKETTES

	10	100
DYSAN 5" SS/DD	31.99	299.99
DYSAN 5" DS/DD	38.99	369.99
MAXELL 5" SS/DD	27.99	259.99
MAXELL 5" DS/DD	37.99	359.99
VERBATIM 5" SS/DD	24.99	235.99
VERBATIM 5" DS/DD	36.99	349.99

QUADRAM

MICROFAZER Par/Par 8K	129.99
MICROFAZER Ser/Ser 8K	139.99
QUADBOARD I or II	269.99
QUADCOLOR I	205.99
QUADCOLOR UPGRADE	209.99
QUAD 512 + (64K)	219.99

APPLE

\$CALL

**Complete Product Lines
Available For Apple!**

BEAGLE Apple Mechanic	19.99
DOLLARS & SENSE	69.99
FLIGHT SIMULATOR II	37.99
KENSINGTON System Saver	64.99
KOALA TouchTablet	85.99
KRAFT Joystick	44.99
MOCKINGBOARD	119.99
ORANGE MICRO Grappler +	114.99
PFS Write (Ile)	99.99
PADDLE ADAPPLE	34.99
THUNDERCLOCK	99.99
ULTIMA III	39.99
VIDEX Ultraterm	249.99

MONOGRAM

\$109⁹⁹



EDUCATIONAL SOFTWARE!

SPINNAKER Facemaker	23.99	Alphabet Zoo	21.99
Fraction Fever	23.99	Delta Drawing	29.99
Kindercomp	21.99	Hey Diddle Diddle	21.99
Snooper Troops I & II	29.99	Story Machine	23.99

ACCESSORIES

FINGERPRINT (Epson Enhancer)	44.99
FLIP 'n FILE (25)	17.99
FLIP 'n FILE (50)	27.99
FLIP 'n FILE (Original 5 1/4")	17.99
KENSINGTON PC Saver	29.99
LIBRARY CASE	1.99
NOVATION Access 1-2-3	469.99
PRINTERS C-ITOH	379.99
Epson FX80	549.99
Epson RX80	349.99
Okidata 82-93	\$CALL
PRINTER STAND Sm. (Plxgls)	24.99
Lg. (Plxgls)	29.99
RIBBONS-FX, MX, RX80	4.99
FX, MX, RX100	7.99
Many Others Available	\$CALL

**- SINCE 1977 -
RETAIL SHOWROOMS
IN CALIFORNIA:**

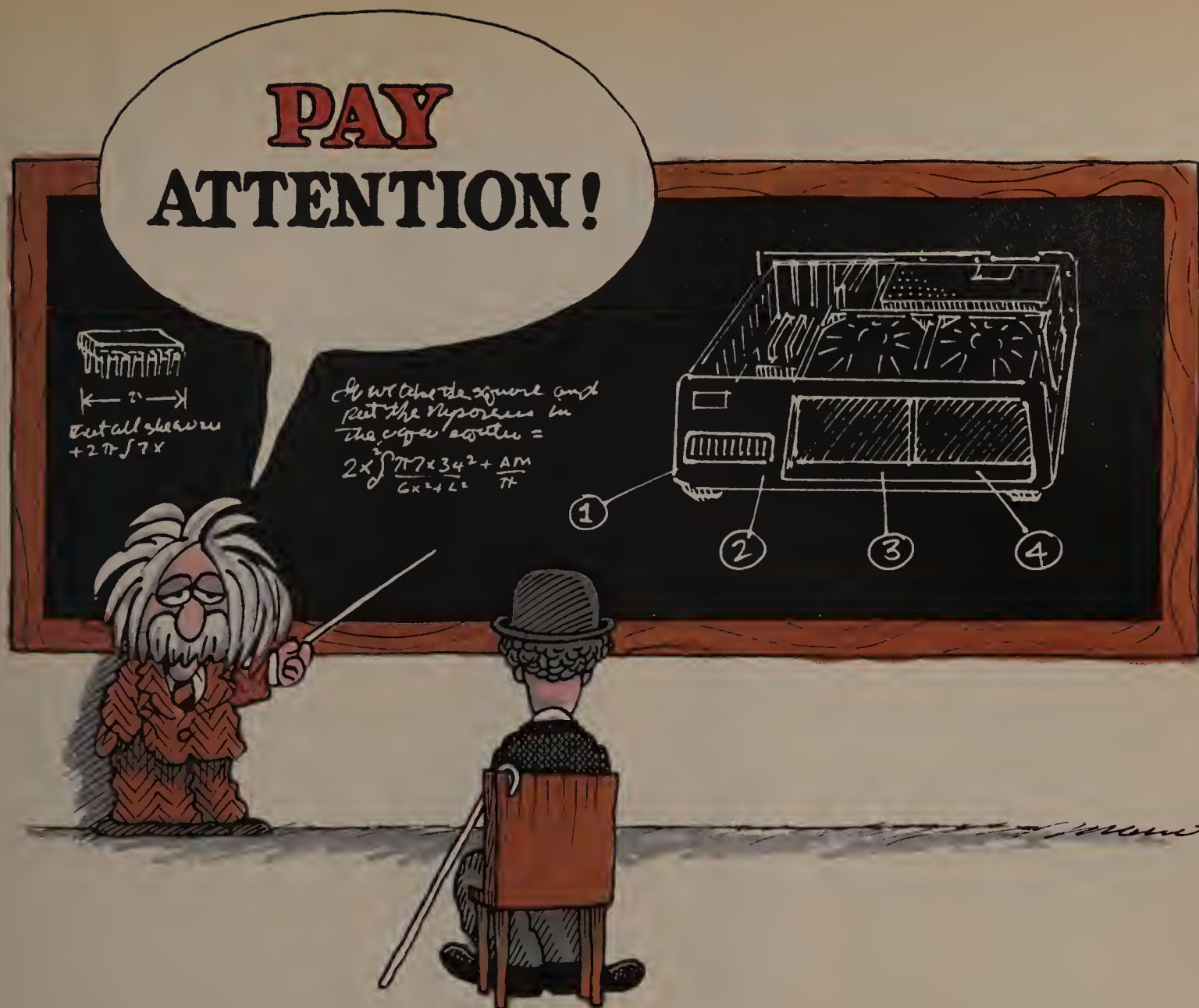
San Jose • (408) 241-2300
San Mateo • (415) 571-1658
San Francisco • (415) 626-2244

COMPUTER DISCOUNT PRODUCTS
860 S. Winchester Blvd., San Jose, California 95128
MAIL, PHONE, WILL-CALL SERVICE FROM 6AM (PST)

- CALL (408) 985-0400 -

- No Charge For Credit Cards
- Prices Subject To Change
- Software Sales Are Final
- International Orders Welcome
- Min. UPS Chg. \$4 + Ins.
- Min. US Postal Chg. \$10
- P.O.'s Welcome - Call First





BRING OUT THE GENIUS IN YOUR PC.

Now you can do it, with Sigma Designs' Expansion system. Raise your personal computer's I.Q. to XT level and beyond. Sigma gives you room to expand with almost twice the capacity of any other system on the market. Yet its quality, performance and versatility can be yours, for much less.

E = MC² (Expandability = More Capabilities²)

The Sigma Expansion Chassis provides 9 card slots, room for two full height 5 1/4 inch disk drives, and a heavy duty power supply. Thanks to its DMA support, all commercially available expansion cards can be installed, including those with memory. The chassis' easy installation, attractive design and rugged construction make it the perfect complement to any system.

Relatively Speaking, We've Got A Drive For Every Need

Upgrade your PC to an all powerful tool. As a sophisticated disk subsystem, our chassis can be configured with any of the following storage devices (photograph, left to right): Streaming Tape Back-Up (20, 40, 60MB); Half Height 10MB Hard Disk Drive; Half Height 2.8MB Floppy Drive with preformatted media for back-up (it can also read standard 48/96 TPI diskettes); Full Height Winchester Hard Disk Drives (10, 15, 33MB).

ISN'T IT TIME YOU HELP CHARLIE GRADUATE?



**SIGMA
DESIGNS**

SIGMA DESIGNS, INC.
2990 Scott Blvd.,
Santa Clara, CA 95050
(408) 496-0536

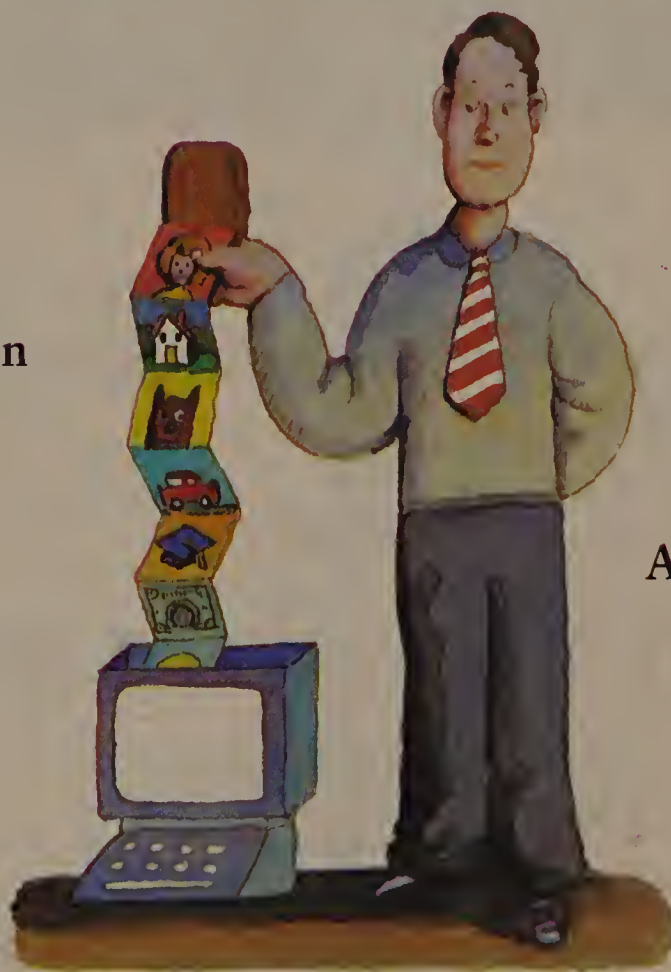


Get More Out of Your PC

Manage Your Information Effectively

Stay Informed and Knowledgeable

Annual Hardware and Software Reviews



PC World shows you how other users are turning their PCs into incredible time-saving tools, using them for spreadsheet analysis, word processing, communications, information management, and much more. You'll learn how people are using PCs to work smarter and to solve all kinds of problems in all kinds of businesses.

Stay Informed and Knowledgeable. At *PC World*, we're PC users ourselves. We constantly review and evaluate the newest in portable PCs, printers, communications interfaces, and software. We tell you what other PC users think, too. So you'll always know what's coming, what to look for, and how to make smart buying decisions.

Annual Hardware and Software Reviews. Compiled by *PC World's* editorial

experts, the annual special issues are the most thorough reference guides available to products for the IBM PC and compatibles. The hardware and software reviews include specs, sources of supply, and price ranges—everything you need to make the buying decisions that are right for you.

PC World is the only magazine that covers it all—consistently, professionally, and thoroughly.

Free Book with Your *PC World* Subscription. Now available for the first time, *Get More Out of Your PC* contains more than 100 pages of articles, reviews, tips, advice, and how-to help. You'll learn how to use a spreadsheet to maintain your stock portfolio, choose the word processing program that's right for you, keep track of your busi-

ness expenses with a data base, choose a modem, have a computer correct your spelling, and much, much more.

Special Limited-Time Offer. Now for a limited time only you can take advantage of this special introductory offer and save 47% off the newsstand price of *PC World*. You'll get 12 monthly issues and 2 special issues of *PC World* PLUS a free copy of the valuable reference book, *Get More Out of Your PC*. But supplies are limited; you must subscribe before September 30, 1984, to take advantage of this special offer.

Guarantee. If *PC World* doesn't live up to your expectations, cancel your subscription for a full refund on all unmailed issues. No questions asked. The book *Get More Out of Your PC* will still be yours to keep.

PC WORLD

LOOK WHO BUYS SOFTWARE FROM US!

IBM • XEROX • NCR
CHEVRON • GTE • SPERRY
IFR SPACE CENTER • ARAMCO
AT&T • BENDIX • PRICE WATERHOUSE
HEWLETT PACKARD • GENERAL ELECTRIC
GENERAL DYNAMICS • TRW • KAISER CEMENT

If you order software from us, you're in good company. You see, some of our best customers are America's biggest corporations.

Maybe they're attracted by our low, low prices (big companies are price-conscious too!).

Or maybe when you're an "IBM", you're looking for something extra. Like the personal service, giant inventory, and in-depth technical support you'll

find at 800-SOFTWARE.

You see, when you call us, we'll take care of you like our business depends on it. Because it does. Which means when you place an order, you can be sure we'll fill it promptly. And that our unique Order Tracking System™ is keeping tabs on your order every step of the way.

Most important, we'll be there if you need us after your software arrives. We'll make

sure that you'll receive the finest technical support and customer service in the industry. And that's a promise.

Next time you're looking for low price and great service, do what IBM, General Electric, and a lot of other big companies do. Pick up the phone and give us a call.

We'll show you why some hard-headed companies buy their software from us.

CHECK OUT ALL OUR INCREDIBLE BUSINESS SOFTWARE PRICES:

WordStar® PROF PAK \$389		Lotus™ 1-2-3 \$329		EasyWriter II System™ CALL		dBASE II™ \$399			
WordStar® \$269		InfoStar™ \$289		IUS Accounting™ CALL		Crosstalk™ \$119			
ANDERSON BELL™ Abstat \$339 ASHTON-TATE™ dBase II \$399 dBase II User's Guide \$ 20 AST™ 6-Pack Plus CALL ATI™ TRAINING PRODUCTS CALL BUSINESS SOLUTIONS™ Jack 2 CALL CDEX™ TRAINING PRODUCTS CALL CONDOR™ 3 \$269 CONTINENTAL™ Home Accountant \$105 DIGITAL RESEARCH™ CPM B6 CALL Concurrent CPM B6 CALL CBasic 86 CALL All Other Products CALL		FOX & GELLER™ Quickcode \$199 dGraph \$199 All Other Products CALL HAYES™ Smartmadem 300 \$249 Smartmadem 1200 \$549 Smartmadem 1200B \$489 HERCULES™ Calar Graphics Card \$409 HOWARDSOFT™ Tax Preparer \$229 HUMANSOFT™ DB Plus \$ 79 IMSI™ 4-Point Graphics \$129 All Other Products CALL IUS™ EasyWriter II System CALL EasyWriter I System \$140 IUS Accounting CALL All Other Products CALL		LIFETREE™ Volkswriter Deluxe \$179 LOTUS™ 1-2-3 \$329 MAXELL™ DISKETTES CALL MEMOREX™ DISKETTES CALL MICROPRO™ WardStar (w/Training Mod.) \$269 WardStar Prof. Pak (WS/MM/SS/Sl) \$389 WardStar/MailMerge \$369 InfoStar \$289 Options Pak (MM/SS/Sl) \$169 MailMerge \$139 PlanStar \$339 ReportStar \$229 Star Index \$129 All Other Products CALL MICRORIM™ RBase 4000 \$369		RBase Extended Report Writer \$109 RBase Program Interface \$299 MICROSOFT™ Fartran \$269 Multiplan™ \$149 Ward™ \$289 Ward™ w/Mouse \$359 All Other Products CALL MICROSTUF™ Crosstalk \$119 NORTON™ UTILITIES \$ 59 PALANTIR™ CALL PEACHTREE™ PEACHTEXT 5000 \$239 PERFECT SOFTWARE™ Perfect Writer \$209 Perfect Link \$119 All Other Products CALL QUADRAM™		Quadbaards 64K/256K \$329/\$489 Quadlink \$559 ROSESOFT™ Pro Key \$ 99 SOFTWARE PUBLISHERS™ PFS File \$105 PFS Graph \$105 PFS Report \$ 95 PFS Write \$105 SOFTWARE SYSTEMS™ Multimate \$349 SORCIM™ Supercalc 2 \$169 Supercalc 3 \$259 All Other Products CALL THOUGHTWARE™ CALL VISICORP® Visicalc Advanced (Apple IIe) \$269 Visicalc \$189 Visi-On Products CALL All Other Products CALL	

WE ALSO CARRY HUNDREDS OF OTHER PRODUCTS!



WRITE:

800-SOFTWARE, INC.
940 Dwight Way, Suite 14
Berkeley, CA 94710



Copyright 1980 Software 1984
Microsoft is a registered trademark

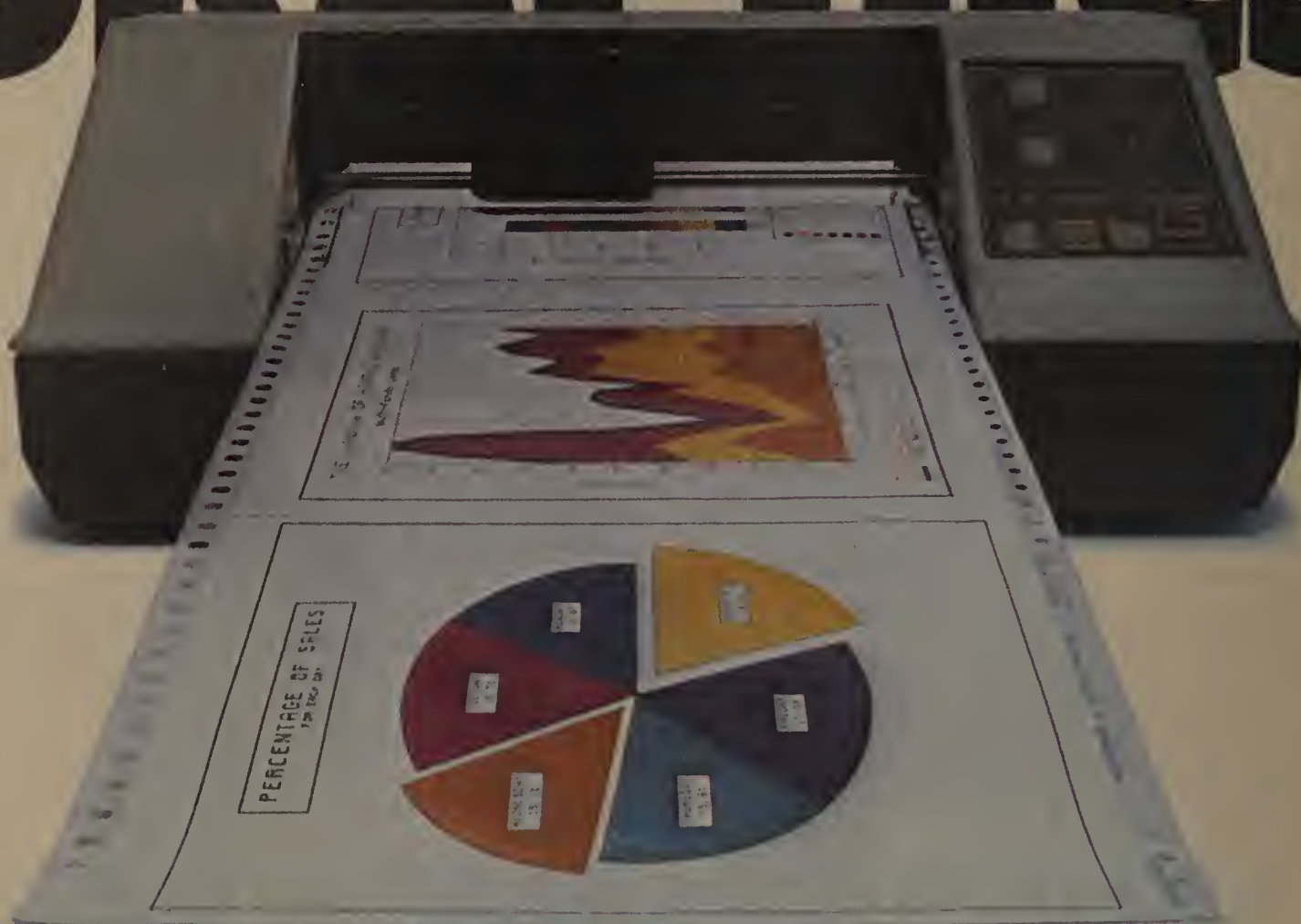
800-SOFTWARE

TO ORDER CALL TOLL FREE:
800-227-4587 or 415-644-3611

- ☐ We guarantee our products against manufacturing defects.
- ☐ Quantity discounts available through our National Accounts Program.
- ☐ Purchase orders accepted. Please call in advance.
- ☐ Prompt U.P.S. or Federal Express shipping. Overnight delivery available. Call for shipping charges.
- ☐ Call for free catalog and other low software prices.
- ☐ We do not add surcharge for credit card purchases.
- ☐ Prices may change.
- ☐ International orders welcome: Telex #751743 800-SOFTWARE UD.
- ☐ CompuServe Key Word "GO-EH"

IBM PC
COMPATIBLE

FRESH EIGHT COLOR GRAPHICS



(Now you can put an entire graphics department on your desktop.)

Getting ahead often depends upon getting your ideas across forcefully. That's what the ZETA 8 does best. By creating vivid color pictures that communicate with power. Whole ideas transmitted at a glance. Trends made clear.

Try eye-stopping graphics like these at your next presentation and watch the reaction you get.

Introducing the ZETA 8, our new 8 color desktop plotter that never stops to change pens.

Let's face it, most reports and presentations get done in a rush. That's why we've designed a system that goes at high speed (20 inches per second). But here's the kicker. Other plotters keep their pens off to one side so every time there's a color change the plotter grinds to a halt. Top speed drops to zero. We've put all eight pens on one carriage so the plotter never has to stop.

In fact, the ZETA 8 can be pre-programmed to create plots without operator intervention over 120 feet of paper.

Plot on acetate for overhead projection too. The ZETA 8 features a handy automatic paper load, a metric mode, and has been designed to support most computer protocols.

Nobody's ever made so much plotter for so little money.

That's right. A lightweight, portable plotter with eight different colors (and no time out for changing pens), a top speed of 20 i.p.s. and accuracy to within one one-thousandths of an inch.



Call (415) 372-7568. Nicolet Computer Graphics Division, 777 Arnold Drive, Martinez, CA 94553 TWX 910-481-5951

Nicolet
Computer Graphics Division

Totally Unwarranted

The forbidding disclaimers posted on software packages don't tell the whole story. There are limits to how limited a warranty can be.

Phillip Gordon

Why should you spend your time on something you've been told is useless? If you've read this far, you have either sufficient faith that this article will contain something of value to you or sufficient time to waste if it doesn't. Such a judgment becomes more crucial, however, when more than time is involved—when, for instance, the cost of a software package is at stake. Yet most software packages include a disclaimer similar to the one in the previous paragraph. The disclaimer states that you are buying at your own risk, “as is,” and if the software does not perform the functions you bought it for, tough luck; all the publisher will do is send you a new disk if the first one is bad—provided, of course, that you can prove you did not damage the disk by trying to use it.

What can you do if the software you buy fails to do what it is supposed to do? This issue is important to both business and home computer users. It may be more confusing for the latter group, since many consumers have little experience with personal computers or software. They buy software with the same expectations with which they would buy an appliance: they expect to get reason-

able value for their money. The lack of consumer knowledge coupled with the lack of guarantees makes software one of the riskiest products you can buy.

The Warranty Umbrella

What happens if you buy a payroll package and your employees don't get paid for a month? Where do you turn if you buy an accounting package so bug-ridden that your business folds because you spent all your time playing programmer rather than watching your cash flow turn into a trickle? The laws governing a software buyer's rights are not yet clear, but there are a few rules with which you should be familiar. The world of

warranties and disclaimers controls your relationship with the dealers who sell and the companies that produce software.

It has long been recognized that both businesses and private consumers need some form of protection in the marketplace. Most sellers of goods are not incompetent or dishonest, but commerce can be complicated. In recognition of that fact, federal legislators have created a set of laws that spell out the responsibilities and rights of sellers and buyers.

The sale of “goods” is governed at the federal level by the Uniform Commercial Code (UCC). Goods are

WARNING: Read this article at your own risk. It is not intended to inform, enlighten, or otherwise be of any use. If you don't learn anything, it's not my fault. If you do learn something, that's not my fault either. However, if during the first 90 days you have this article the print becomes illegible, I will send you a new copy.

● Community

defined in the UCC as "movable" items, such as refrigerators and lamb chops. Although its purpose is to deal with "commercial transactions," that is, transactions between businesses, the UCC also applies to dealings between consumers and businesses.

The UCC defines three types of warranties that provide protection for buyers. The first is "express warranties"—anything written or spoken about the product. That includes advertisements and statements made by salespeople, not just statements that include the words *warranty* or *guarantee*. The maker and the seller of the goods can be held responsible for any inaccurate statements they make about a product.

Consumers are also protected by the "implied warranty of merchantability," which is based on the assumption that there is a tacit understanding between buyer and seller that an item will do what it is supposed to do. You can assume, for example, that a washing machine will clean clothes, a typewriter will produce typed copy, and a car will get you from point A to point B.

The last warranty set out by the UCC is the "implied warranty of fitness" given by a seller. This warranty is based on the assumption that a seller in some way gives you advice by selling you an item in response to a need you have expressed; by selling you the item, the seller implies that the product will fill that need. In some cases you don't even have to express the need directly. For example, in a restaurant it is assumed that the staff's knowledge will prevent them

from serving you tainted food. In buying software the implied warranty of fitness can be very important, since a salesperson's advice is often the crucial factor influencing a purchase.

Because software is in some ways a unique product, sold in ways that are not common to other "goods," there is still considerable debate over whether or not the UCC warranties apply to software sales. When you buy software, what you really buy is a disk and, usually, a license to use

Most judicial decisions have favored the consumer.

the program stored on it. The legal question of whether the sale of a license to use software is really a "sale" as covered by the UCC is not yet resolved. And software is not strictly movable "goods." You cannot hold software in your hand or carry it away with you; you can move only the disk, not the program. Software publishers claim that the only product they are selling is the disk that holds the software and that the software itself is distinct from the medium that contains it.

Until the courts settle these questions, a manufacturer or a dealer can always claim that their software is not covered by the UCC. However, the courts are not likely to agree with them; most judicial decisions have favored the consumer. Also, if the software is included with a sale of hardware, which is definitely "goods," the entire bundle is usually covered by any accompanying warranty.

Holes in the Umbrella

The UCC also provides protection for manufacturers. The UCC allows a manufacturer to disclaim any or all of the UCC warranties by simply attaching a written statement to the product announcing that any express and/or implied warranties are not in effect. IBM places such a disclaimer on all its software packages just under the shrink wrapping (see Figure 1).

A disclaimer that is not prominently displayed cannot protect the seller. If you buy software and find the disclaimer only after you unwrap the product, chances are that most courts will view the disclaimer as invalid. Also, some states do not allow manufacturers to disclaim the implied warranties.

Warranty disclaimers were first introduced to the computer industry by manufacturers of mainframe computer software and hardware. In that environment a disclaimer is perfectly fair because most of those sales are based on some kind of negotiated contract, with provisions covering expectations and responsibilities. The manufacturer can disclaim only responsibilities not covered in the contract.

But microcomputer software manufacturers have been quick to take advantage of the UCC's disclaimer loophole, claiming that a software manufacturer cannot possibly predict all the possible uses of a product, nor can it accommodate every level of user from novice to systems analyst. The easiest way out of the legal morass of responsibility for the manufacturer is to disclaim a product's fitness for any purpose—putting the responsibility squarely in the lap of the dealers and, ultimately, the customer.

This is an unfair burden to impose on dealers and consumers, because personal computer software buyers often don't know what features they need, much less what product they should buy. They can seldom test a piece of software before buying it.

Dealers and their salespeople likewise cannot test every product or know everything about the software they carry. But as long as manufacturers remain united in their disclaimers, the burden will remain where it is.

Patching the Holes

Warranty law has been extended beyond the UCC to explicitly cover "consumer" transactions through the Magnuson-Moss Consumer Warranty Act, a set of laws that cover the sale of "tangible personal property" to an individual, a family, or a household. The Magnuson-Moss Act limits the ability of a manufacturer to disclaim the implied warranties of fitness and merchantability, at least if a written warranty is given. If a software product is covered by a written warranty, a publisher can at best limit its liability for the implied warranties to the same period set for the written warranty.

If there is no written warranty, however, a publisher can legally disclaim all express and implied warranties. IBM tries to do this with its disclaimers and by not advertising its software very often, since ads can be considered an express warranty. But according to Daniel Remer, an attorney specializing in computer law and the author of *Legal Care for Your Software* (Nolo Press, Berkeley, California, 1983), since every sale is covered by an implied warranty under the UCC, the Magnuson-Moss Act may apply even to a product that has no written warranty, taking away a manufacturer's right to disclaim implied warranties under any circumstances.

While there has not yet been a significant number of court decisions testing the Magnuson-Moss Act, Remer feels that consumers can win in small claims court (or even in a full-fledged lawsuit) if they base their argument on the act's limitation on disclaimers.

But the Magnuson-Moss Act, like the UCC, was not drafted with software in mind. There is likely to be the same problem of legal definition as there was with the UCC. In this case the problem is whether or not software is "tangible personal property." The predisposition of the courts toward the consumer under the UCC will probably extend to Magnuson-Moss, however, so even if a definitive ruling that software is "tangible personal property" is not forthcoming, the consumer will still be in good shape.

Remer feels that the courts' consumer bent not only helps the purchaser but will ultimately help the software publishing industry as well. After publishers discover the shakiness

of their disclaimers and the vulnerability of their software to consumer law, they will be forced to exercise better quality control and make more moderate claims for their software. That should result in software that is easier to use. The results: less computerphobia, more computer use, and fewer lawsuits against dealers and software publishers.

Protecting Yourself

Until the necessary legal battles are fought, there are ways you can safeguard your software investment. The law offers some protection to the consumer that cannot be totally disclaimed by manufacturers.

LIMITED WARRANTY

THE PROGRAM IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU (AND NOT IBM OR AN AUTHORIZED PERSONAL COMPUTER DEALER) ASSUME THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

IBM does not warrant that the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error free.

However, IBM warrants the diskette(s) or cassettes on which the program is furnished, to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt.

Figure 1: IBM's limited warranty

Be Creative!

...and save valuable dollars
enhancing your
IBM PC or compatible!

10 MB INTERNAL HARD DISK FOR YOUR IBM PC

- includes 10 MB drive, controller, cables & installation instructions
- one year warranty
- DOS 2.0 boots directly from Hard Disk with IBM PC2
- PC/XT compatible
- no special software needed

MEGA FLOPPY-HIGH CAPACITY FLOPPY DISK DRIVE FOR YOUR IBM PC

- Internal\$895
- External\$1045

- 2.6 MB capacity per disk (8 times capacity of standard DS drives)
- controller will support both regular & high density floppy drives
- ideal for winchester backup
- 2.6 MB drive will read regular floppy disks
- 500 KHZ data transfer rate
- includes floppy controller card, disk drive, 2 diskettes, cables & software
- mounts internally in floppy slot
- external unit includes case and power supply

STREAMING TAPE BACKUP FOR YOUR IBM PC

- Internal\$CALL
- External\$CALL

- 45 Megabyte capacity
- uses standard 1/4 inch 3M cartridge tape (DC-300XL)
- fits into 5 1/4 inch floppy slot
- fast 5 MB per minute data transfer rate (backup 10 MB Hard Disk in 2 minutes)
- software allows backup of entire disk or individual files/directories
- includes controller, drive, cables, interface to PC & software
- external unit includes case and power supply

IBM COMPATIBLE

- Multifunction Board w/64K\$249

- serial/parallel/clock/calendar
- optional 2nd serial/game adapter
- up to 384K on board
- up to 512K with stack

- Monochrome Card\$225

- Color Adapter\$235

- Floppy Controller\$169

- Expansion Chasis\$695

- Chasis w/10 MB Hard Disk\$1745
- Chasis w/15 MB Hard Disk\$2045
- Chasis w/33 MB Hard Disk\$3095

- TAXAN, AMDEK, PGS Monitors\$CALL

- OKIDATA, C.I.TOH Printers\$CALL

- HAYES, NOVATION Modems\$CALL

Write or call For Our Free Product List

reative
MICROSALES

171 Mayhew Way, Suite 211
Pleasant Hill, CA 94523

(415) 945-1201



COD PLEASE ADD \$3.00
CA RESIDENTS
ADD 6.5% SALES TAX
AVAILABILITY AND PRICES
SUBJECT TO CHANGE WITHOUT NOTICE



Community

Before you buy any software, get information from a reputable dealer about packages that might meet your needs. After you return home, type up a description of your needs and the solutions suggested by the dealer. Bring this document with you when you return to buy the software and have the dealer sign it. This list is the closest thing there is to an express

It will be some time
before the laws cover-
ing software warranties
become as clear as
those that govern buy-
ing a car.

warranty from the dealer. It acts as a contract with the seller, setting out the specified obligations of the seller and the expectations of the buyer.

Even when a manufacturer is protected by a valid disclaimer, you may still have some recourse; a dealer is not protected by a manufacturer's disclaimer. A dealer can also use disclaimers under the UCC, but doing so would pose practical problems: a disclaimer inserted in a sales pitch would quickly cool a customer's enthusiasm.

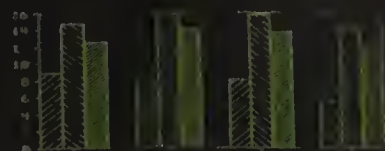
It will be some time before the laws covering software warranties become well enough defined to make the responsibilities of the parties in software purchases as clear as those in buying a car. This is because the stakes are often too small to justify

taking a case to a higher court, where a definitive judgment could be made. Most disputes between software buyers and dealers or manufacturers are settled out of court, often in favor of the consumer in return for the consumer's silence about a product's deficiencies.

There are ways, however, to settle problems with a dealer or a manufacturer without involving the legal system. You should first give the dealer and the publisher a chance to remedy the situation through patches, new releases, better documentation, or by refunding your money. Keep a record of your problems by saving letters that pass between you and the dealer and/or the manufacturer. A dealer will often work with you on software problems and extend the time limit on existing warranties if you document the problems you have during the warranty period.

Most software isn't as bad as the manufacturers' ominous disclaimers may lead you to believe. Most products will do what you've been led to believe they will. A more solid base of confidence is being built by the courts as they settle the software cases that will establish a software consumer's legal rights. Until then, let the buyer beware and take precautions. ●

Phillip Gordon is a senior systems analyst at a large financial institution in San Francisco.



The STB Graphix Plus™: an affordable way to put a whole new complexion on your IBM PC or XT.™

You get color or monochrome graphics plus a parallel printer port, all in one slot.

Our Graphix Plus multi-function video board gives you three of the most in-demand text and graphics capabilities for one very attractive price.

Graphix Plus includes functions for color or monochrome graphics and text displays, and a parallel printer. A clock/calendar is available as an option.

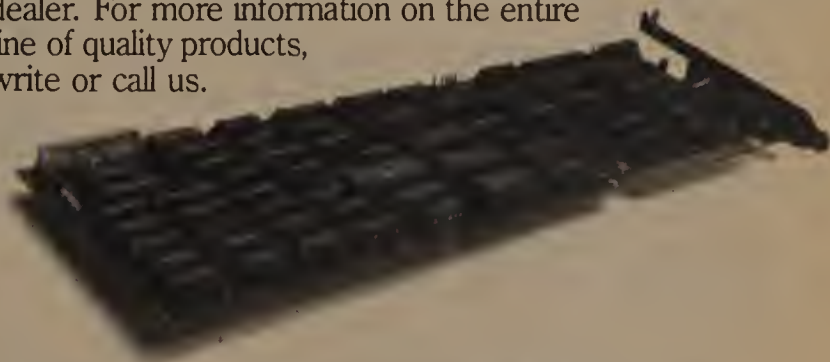
This versatile board will drive an RGB color monitor or composite B&W monitor with the identical colors, resolution and modes as IBM's Color/Graphics Monitor Adapter. Graphix Plus improves on IBM's adapter with 50% faster scrolling, which eliminates annoying flashing and flicker.

Graphix Plus also drives the IBM monochrome display, in graphics and high resolution text modes, and is compatible with Lotus 1-2-3™, Microsoft Flight Simulator™ and other popular software. And, Graphix Plus provides for extended text capability.

Graphix Plus also includes a lightpen interface and PC

Accelerator, STB's super ram disk emulator and print spooler program.

For a graphic demonstration of how Graphix Plus can expand your personal computing capabilities, see your local dealer. For more information on the entire line of quality products, write or call us.



Expanding Microcomputing

STB™
STB Systems, Incorporated

601 N. Glenville Avenue, Suite 125
Richardson, Texas 75081 / (214) 234-8750

IBM PC/XT is a registered trademark of International Business Machines Corporation.
Lotus 1-2-3 is a registered trademark of Lotus Development Corporation.
Microsoft is a registered trademark of Microsoft Corporation.
PC Accelerator is a registered trademark of ResiCorp.

© 1983 STB Systems, Inc.

Get your Epson's worth with Set-FX+™



SoftStyle™

SoftStyle, Inc. • Suite 205, Dept. B • 7192 Kalanianaʻole Hwy.
Honolulu, Hawaii 96825 • (808) 396-6368

Set-FX+ adds big pluses to the versatility of *all* Epson printers.

- ☐ Simple-to-set print modes, including condensed, emphasized, italics and many more.
- ☐ Print those missing IBM characters, including line graphics, math and science symbols.
- ☐ Create special characters or even design custom fonts.
- ☐ Pivot Printing™ to rotate text 90° for super wide spreadsheets.

Convenient access to your printer's full capabilities,
plus even more.

There are no difficult codes to remember or program.
Set-FX+ menus put printer power at your fingertips!

Set-FX+ software comes with a clear, complete instruction manual, and quick reference guide. Set-FX+ even includes an Ideas program and special fonts to get you started. Special fonts include IBM, Old English, Greek symbols, *plus others.*

No Epson can afford to be without Set-FX+. Only **\$59.95.**

To get *your* Epson's worth, ask your dealer for SoftStyle's Set-FX+ or order direct.

Toll-free orders: 1-800-367-5600

For the IBM PC, PC-XT, PCjr, Compaq and IBM compatibles running DOS. Compatible with the Epson MX, RX, FX and LQ printers as well as IBM graphics printers (MX needs Graftrax III). Set-FX+ prints in full speed text mode on the FX printer. MC/VISA accepted. Add \$2 shipping/handling, U.S. and Canada (\$10 for others).

Circle 410 on reader service card

XT-DRIVER™

**hard disk management system
restores the *power* to your IBM XT**

XT-DRIVER gives you simplified menus for all your application programs, a powerful security tool providing 99 levels of security and complete flexibility to construct both public and private menus. A File Management System, available separately, offers an appointment calendar, office inventory and address file manager. If you're using an IBM XT or other compatible hard disk system without XT-DRIVER, you're missing all the magic. Ask your dealer today about XT-DRIVER and discover just how easy having the power can be.

- | | |
|--------------------------|---------------------------|
| ■ Extensive Security | ■ Encryption |
| ■ Menu Builder | ■ File Hiding |
| ■ Directory Manager | ■ Message Center |
| ■ Enhanced DOS Support | ■ Programmable Calculator |
| ■ User Log Tracking | ■ PC Net Operational |
| ■ Auto Log Off/Video Off | ■ Works with TALLGRASS |

XT-DRIVER Puts the Magic Back.

(basic system \$80)

CHAS-MOORE, INC.

Automation for the way you live

3104 Jackie Court, Bakersfield, CA 93309

805/834-8808

Circle 26 on reader service card

Watch the exciting
new 30-minute weekly
television series...

“Window on PC World”



Presenting an inside look at the world of the
IBM Personal Computer and compatibles—latest
applications, software, hardware, hands-on
reviews, and much more...

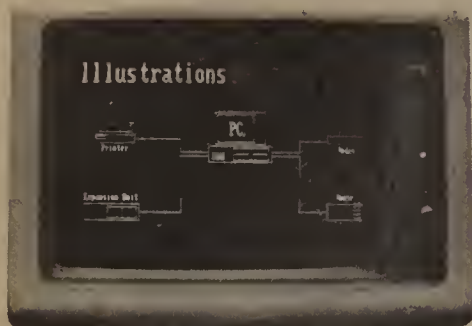
Get a behind-the-scenes look at *PC World*
magazine and the entire personal computer industry.

Please check your local
listings for airtimes.

For further details contact:
Window on PC World
555 De Haro Street
San Francisco, CA 94107
415/861-3861

PYXEL Presentations!

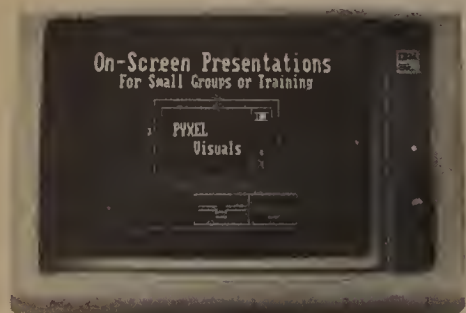
Maximum Quality . . . Minimum Effort



PYXEL Visuals lets you create screens with text in 4 character sizes ($\frac{1}{4}$ " to 1" high) and drawn lines. Reposition any part of the screen with cursor controls. Fully interactive design and edit capabilities. Print horizontally or vertically.

There are no commands (not one!) to learn — or forget! You select the action with the function keys and manipulate the image you see on screen. It's easy — and fast.

Our new BATCHPRINT utility (used for the headline of this ad) lets you print PYXEL Visuals screens in the highest possible resolution on an EPSON or IBM Graphics printer. Create and edit a list of screens (SHOWTIME compatible) then print them while you get a cup of coffee.



The SHOWTIME utility, included with PYXEL Visuals, lets you link screens together and create a free-running show. You choose the time between screen changes. Or use prompt mode to step forward to each screen or go back to a previous screen.

Requires: IBM PC with PC-DOS; 128K RAM; Color/Graphics Adapter; Graphics Monitor; EPSON with graphics or IBM Graphics Printer. Prowriter 8510 version available. DOS 2.0 and XT compatible.

PYXEL

APPLICATIONS

2917 Mohawk Dr.
Richmond, VA 23235
(804) 320-5573

PYXEL Visuals - \$98
BATCHPRINT - \$75
MasterCard/Visa Accepted

Circle 766 on reader service card

**Computer
Control
Systems**

DEVELOPERS OF

F A B S & A U T O S O R T

HAVE ADDED ANOTHER FINE PRODUCT TO THEIR LINE OF *QUALITY* SOFTWARE: IT'S *SPEED* WILL AMAZE YOU! WRITTEN IN ASSEMBLY LANGUAGE.

DB-FABS | A DATA, SCREEN, REPORT MANAGER

Very easy for novice users in STAND-ALONE mode . . . Sophisticated RUN-TIME mode for programmers when used with MS BASIC INTERPRETER or COMPILER . . . Creates files/forms/reports . . . Fast keyed-access with B-Tree Indexing . . . High Speed sort on up to 10 fields w/select capabilities . . . Deleted file archive . . . Multiple file linking for detailed report generation . . . Fields can be indexed at any time . . . up to 64 fields per file with 255 chars per field, 8,160 chrs/rec, for 65,535 records . . . Preset conditions for data files, forms, keys . . . Automatic update for indexed files for additions/deletions/edits . . . All associated data files automatically changed when file edited/erased . . . Files/forms/reports easy to alter/edit/modify . . . Reports can be redirected to a disk file for use with word processor . . . Screen forms permit easy entry of data . . . Report generation extremely easy with many flexible features . . . Run-time mode will REVOLUTIONIZE programming for programmers . . . Generate reports from run-time . . . Sequence data files . . . Erase/create index files at will . . . Control video enhancements . . . Sort data files to create new data files/w/conditional output . . . Commands for full screen control if your Basic lacks this ability . . . Convert Basic data files to DB-FABS files and vice-versa during run-time . . . Easy tutorials for stand-alone and run-time modes . . . Manual written in simplistic style for ease in implementing . . .

For MS-DOS or PC-DOS on IBM-PC/XT, DEC Rainbow, Victor 9000, Sanyo and other computers.

RETAIL PRICE . . . \$295 + SHIPPING

DEALER INQUIRIES WELCOMED

COMPUTER CONTROL SYSTEMS, INC., 298 - 21st Terrace S.E., Largo, Florida 33541 (813) 586-1886

Circle 270 on reader service card

Price and Technical Support
Make the Difference



Join the Team that has Both!

COMPUTERS:

Columbia MPC Computer }
Columbia VP Portable } Call
Corona Computer Systems } and
Eagle Computers } SAVE

PRINTERS:

Dot Matrix:

Delta 10	\$465.00
Epson FX-80	\$525.00
Epson FX-100 IN STOCK	\$699.00
Epson RX-80	\$514.00
Epson RX-80 FT	\$705.00
Gemini 10X	\$269.95
Gemini 15X	\$399.00
Okidata 92	\$429.00
Okidata 93	\$729.00
Prowriter I	\$339.00
Star STX-80	\$139.95

Letter Quality:

Daisywriter 2000 w/48K	\$989.95
NEC 2000 Series	\$ CALL
Toshiba 1351	\$ CALL

MONITORS:

Amdek 300 Amber	\$129.00
Amdek 300 Green	\$149.00
Amdek Color I Plus	\$299.00
Princeton Color Graphics	\$479.00

MODEMS:

Hayes 300	\$195.00
Hayes 1200	\$469.00
Hayes 1200B	\$435.00
Signalman Mark I	\$ 75.00
Signalman Mark 12(300/1200)	\$259.00

DISKETTES:

Elephant DS/DD	\$ 24.95
Maxwell MD-2	\$32.95
Verbatim DS/DD	\$ 34.95

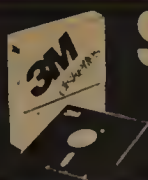
write for free catalog

TEAM COMPUTER PRODUCTS

109 Church Street
New Haven, CT 06510

National Order Desk:
1-800-343-2325

Technical Questions and CT Residents:
(203) 785-1606



SAVE MORE THAN EVER ON...

3M Scotch® DISKETTES

AND OTHER COMPUTER NEEDS!



LIFETIME WARRANTY!

3M BULK DISKETTES AT TREMENDOUS SAVINGS!

These are *genuine* 3M diskettes with a lifetime warranty. But they are bulk packed in cartons of 50 with separate white Tyvec envelopes. **No identification labels, write protect tabs or cartons are provided!** A great buy for volume users.

\$160 ^{ea.}	← 5¼" SSDD	\$202 ^{ea.}	← 5¼" DSDD
Qty. 50		Qty. 50	

5¼" SSDD-96TPI	\$2.20	5¼" DSDD-96TPI	\$2.75
----------------	--------	----------------	--------

All have reinforced hub.
SOFT SECTOR ONLY!

(for IBM, APPLE, KAYPRO, DEC and about 99% of all computers.)
Must be ordered in multiples of 50!

BOXED 3M DISKETTES WITH ALL THE TRIMMINGS!

Factory-fresh 3M packaging with envelopes, 3M logo labels, ID labels and write-protect tabs.

\$185 ^{ea.}	← 5¼" SSDD	\$235 ^{ea.}	← 5¼" DSDD
Qty. 20		Qty. 20	

5¼" SSDD-96TPI	\$2.60	8" SSDD	\$2.05
5¼" DSDD-96TPI	\$3.25	8" SSDD	\$2.50
		8" DSDD	\$3.10

Minimum order of 20 diskettes. Additional diskettes in multiples of 10.

3M HEADCLEANING KITS

Stop swearing and start cleaning. This non-abrasive cleaning kit has everything you need for thirty applications.

\$23.00 + \$1.50 Shpng.

SAVE MONEY WITH A CLEAN COMPUTER! INTRODUCING MINI-VAC



Most computer malfunctions are caused by dust. MINI-VAC is ideal for cleaning keyboards, screens, drives and printers. (Great for photo equipment, too!) Equipped with an easy-empty bag, two directional wands and two fine-brush nozzles. Don't compute without it. (Requires 9-volt battery which is **not** included.)

\$21.95 + \$3.00 Shpng.

AT LAST: A DISK DRIVE DIAGNOSTICS SYSTEM THAT WORKS!

The Dymek Recording Interchange Diagnostic (RID) is a **professional**, but easy to use, drive diagnostic disk. It tests drive speed, radial position, hysteresis, write function, erase crosstalk, signal-to-noise and clamping. In short, it's a professional's system that will help you keep your machine in prime condition...and avoid the evils of data loss.



\$29.95 + \$1.50 Shpng.

MEDIA-MATE 50:

A REVOLUTION IN DISKETTE STORAGE

Every once in a while, someone takes the simple...and makes it elegant. This unit holds 50 5¼" diskettes, has grooves for easy stacking, nipples to keep diskettes from slipping in the case and several other features. We like it.

\$10.95 + \$2.00 Shpng.



DISKETTE 70 STORAGE: STILL A GREAT BUY

Dust-free storage for 70 5¼" diskettes. Six dividers included. An excellent value.

\$14.95 + \$3.00 Shpng.

PRINTER RIBBONS AT BARGAIN PRICES.

EPSON MX-70/80	\$3.58 + 25 Shpng.
EPSON MX-100	\$6.99 + 25 Shpng.
Okidata Micro 84	\$3.66 + 25 Shpng.
Diablo 630 Mylar	\$2.60 + 25 Shpng.
Diablo 630 Nylon	\$2.93 + 25 Shpng.

THE END TO RS-232 CABLE PROBLEMS: SMARTCABLE

Now interfacing almost any two RS-232 devices is simple and quick. Just plug in SMARTCABLE and flip two switches. The logic of both devices is figured out immediately and you can get to work.

\$79.95 + \$1.50 Shpng.

Shipping: 5¼" DISKETTES—Add \$3.00 per 100 or fewer diskettes. 8" DISKETTES—Add \$4.00 per 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to diskette shipping charges. **Payment:** VISA and Mastercard accepted. COD orders only, add \$3.00 handling charges. **Taxes:** Illinois residents, please add 8% sales tax.

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE
ON THE SAME PRODUCTS AND QUANTITIES!**

Nationwide: 1-800-621-6827

Illinois: 1-312-944-2788

Hours: 9AM - 5PM Central Time

Minimum Order: \$35.00

DISK WORLD!, Inc.

SUITE 4806
30 EAST HURON STREET
CHICAGO, ILLINOIS 60611

Authorized Distributor
Information Processing Products



SPF/PC™

ACTUALLY, there is no comparison. SPF/PC is the best full-screen editor available for the IBM Personal Computer.

It looks and works like IBM's large system SPF editor.

- SPF/PC can use up to 786K of memory as workspace.
- Word processing commands.
- 4-way scrolling.
- Split screen support.
- On-line help facility.
- Can edit up to 240 character records.
- Monochrome or color supported.
- Instantaneous screen display.
- Block Move/Copy/Repeat/Delete/Overlay/Shift/Exclude
- Automatic line numbering supported.
- 40 user-definable Program Function Keys.
- Direct interface to DOS commands for PC DOS 2.0 users.
- Browse sub-system.
- Move/Copy sub-system copies any file format.
- Utilities include: Rename/Delete/Print/Directory list.

AND MUCH MORE . . .

UPLOAD/DOWNLOAD sub-system available to SPF/PC users for \$50.00.

\$149.95 SPF/PC requires 128K, PC DOS, and 1 disk drive.

THE ODD-COUPLE™

Allows the APPLE and IBM/PC to communicate with each other.

- Connect APPLE to PC, APPLE to APPLE, and PC to PC.
- Transfer any file in either direction.
- CHAT mode allows direct communications through the keyboard.
- An Equipment Profile allows description of your operating environment.
- Communicate Direct or through a Modem at speeds up to 9600 baud (bps).
- Written entirely in machine language for speed and efficiency.

REQUIREMENTS:

APPLE — 48K, 1 disk drive, Serial Interface

IBM — 64K, 1 disk drive, Serial Interface

\$79.95

For orders and dealer information write or call Rogue River Software, 2822 Tahitian Ave., Medford, OR 97504, (503) 779-3002 Mastercard/Visa, Check, or P.O. accepted. Add \$5.00 for shipping. Canada \$10.00. Foreign \$15.00.

IBM is a registered trademark of International Business Machines, Inc. APPLE is a registered trademark of Apple Computer Inc.

Circle 380 on reader service card

8087 SUPPORT and FORTRAN for your PC

87FORTRAN/RTOS™ - our adaptation of the Intel Fortran-86 Compiler generates in line 8087 code using all 8087 data types including 80-bit reals and 64-bit intergers. The compiler uses the Intel large memory model, allowing code/data structures of a full megabyte, and supports overlays. Includes RTOS and support for one year **\$1350**

87PASCAL/RTOS™ is Intel's ISO-Standard Pascal with 8087-8088 exceptions. These make it possible to use all the 8087 data types directly, while generating modules in one of the three Intel Memory Models. Includes RTOS and support for one year **\$1350**

RTOS DEVELOPMENT PACKAGE includes 87FORTRAN, 87PASCAL, PL/M-86, Utilities, TX Screen Editor and RTOS . . . **\$2500**

RTOS—

REAL TIME MULTI-TASKING/ MULTI-USER EXECUTIVE

RTOS is a Micro Ware configured version of iRMX-86. Includes ASM-86, LINK-86, LOC-86, LIB-86, and the ROM Hex Loader **\$600**

87BASIC/INLINE™ generates inline 8087 code! Converts the IBM Basic Compiler output into an assembly language source listing which allows the user to make additional refinements to his program. Real expression evaluations run five times faster than in 87BASIC. **\$200**

MWS-286™ Configured to your specifications, our computer runs RTOS-286 or XENIX. Includes one Intel compiler, seven slot multibus chassis, hard disk, streaming tape backup and Intel Service Contract. Six to twenty times faster than your PC **CALL**

87BASIC™ includes patches to the IBM Basic Compiler and both runtime libraries for USER TRANSPARENT and COMPLETE 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendentals, addition, subtraction, multiplication, and division. **\$150**

87MACRO™ - our complete 8087 software development package. It contains a "Pre-processor," source code for a set of 8087 macros, and a library of numeric functions including transcendentals, trigonometrics, hyperbolics, encoding, decoding and conversions. . . **\$150**

87DEBUG™ - a professional debugger with 8087 support, a sophisticated screen-oriented macro command processor, and trace features which include the ability to skip tracing through branches to calls and software and hardware interrupts. Breakpoints can be set in code or on guarded addresses in RAM **\$150**

FOR→BAS™ - a library of interface routines which allow MS Fortran programs to call the IBM Basic Compiler library and access features such as the RANDOM NUMBER GENERATOR, SOUND, PLAY, DRAW and SCREEN commands. **\$150**

8087-3 CHIP \$175
including DIAGNOSTICS and 180-day warranty

64K RAM Upgrade. \$47.50

87/88GUIDE - an excellent tutorial on writing 8087 code and interfacing it with compilers. Full of code that runs! **\$30**

MATRIXPAK™ manages a **MEGABYTE!** Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.2, 87MACRO, 87BASIC, and RTOS. each **\$150**

MICROSOFT FORTRAN 3.2 or PASCAL 3.2 - These IEEE compatible compilers support double precision and the 8087 each **\$259**

MICROSOFT C COMPILER includes Lattice C and the MS Librarian. **\$350**

SCO XENIX.™ MICROSOFT **\$595**
Unisource VENIX/86.™ Ventur/Com Inc. **800**
FLOAT87 for MS or LATTICE C. **125**
SuperSoft Fortran 66 **299**
Computer Innovations C86 **345**
STSC APL★PLUS/PC **500**
TURBO PASCAL **45**
TURBO PASCAL with 8087 Support. **85**
HALO GRAPHICS. **CALL**
GRAPHMATIC. **125**
ENERGRAPHICS **295**
Professional BASIC **295**
Kidger Optical Design Program **3000**
COSMOS REVELATION **850**
SuperCalc III with 8087 Support. **CALL**
MAYNARD WS1 HARD DISK. **995**
MAYNARD WS2 HARD DISK **1170**
256K RAM CHIPS. **CALL**
MAYNARD ELECTRONICS Boards. **CALL**

ALL ITEMS IN STOCK

**Micro
Ware**

P.O. Box 79
Kingston, MA
02364
(617) 746-7341

**You Can
Talk To Us!**

Considering Tape For Backup Storage?

...Tut, Tut.



There was a time when tape was the way to store backup data from your hard disk. It was fine for archives, but not when you wanted your data live and on-line. Today's business pharaoh can have his data on-line and backups, too—with 5 or 10 megabyte **removable cartridge** hard disk systems from **Micro-Design**.

Single-function tape backup units can't come close to matching the versatility and cost-effectiveness of hard disk cartridges; you get backup capabilities PLUS the benefit of having another full 5 or 10 megabytes of on-line data access.

Use hard disk cartridges the same way you use a floppy disk system. Just switch them out as needed—one cartridge for wordprocessing, another for accounting, and another for backup storage. Add additional cartridges whenever you like.

Fast. Cartridges run as fast, or faster, than fixed hard disk drives. A 5 megabyte backup takes only a few minutes, using Micro-Design's backup utility software. Switching out cartridges takes just a few seconds.



Convenient and Secure. It's easy to lock-up sensitive files—just remove the car-

tridge and put it somewhere safe. If you share a computer with others, everyone can have their own cartridge. Or, have a home cartridge and a business cartridge for use with your portable computer.

IBM® International Business Machines.

Unlimited Expansion. No more erasing old data to increase space on your hard disk. Fact is, there's no limit to the amount of off-line storage you can add.

Our **DATA Series** 5 and 10 megabyte cartridge hard disks are external drives available in removable only, or paired with 10, 20, or 33 megabyte fixed drives. Our **SQ Series** features 5 megabyte cartridge drives, in matching external cases or ready for internal installation. All are 100% compatible with the IBM-PC, XT, and work-alikes, with no software modifications needed. You can even boot from the hard disk.

Don't let single-function hard disk and tape units send your asp up the Nile. Ask your local computer dealer about Micro-Design's versatile hard disk cartridge units. Or, call us for details on our full product line and ordering information. Dealer inquiries invited.

We've got a complete line of mass storage devices, including floppy drives. Prices start as low as **\$1549** for a 20 megabyte fixed hard disk drive. Call for our **FREE** catalog today!

One year warranty. Network compatible. Backup utility software included with 2 drive systems.



Micro-Design

Making The Most of Your Micro.

Call Toll FREE 1-800-531-5002.

In Texas, call 512-441-7890.

6301 B Manchaca Rd., Austin, TX 78745

The only Project Planning System that
gives you this flexibility:

Project Title Sample Project Data

Main Menu

- 1 --> INPUT
- 2 --> EDIT
- 3 --> RANK / PROCESS
- 4 --> DISPLAYS
- 5 --> REPORTS
- 6 --> VERSION
- 0 --> TO EXIT

enter selection: ? . . .

Quick•Plan

The Executive Project Planning System

- Quick•Plan runs on MS DOS for:
IBM PC, DEC RAINBOW+, WANG PC, HP 150, Data General DT
- Requires: 384K of core, graphics option- 132 wide printer

For more information call or write:



Mitchell Management Systems Inc.

FORMERLY STRUCTURAL PROGRAMMING INC.
Westborough Office Park 2000 West Park Drive Westborough Mass 01581 U.S.A.
Telephone (617) 366-0800 TWX 710-347-1054

Circle 111 on reader service card

ENHANCE WordStar with

P-r-o-p-o-r-t-i-o-n-a-l Spacing on WordStar

You are reading text printed by WordStar in proportional spacing, providing a professional, easy to read, typeset appearance, direct from the print command on any version of WordStar. Also print two or more columns on a page, underline spaces between words, and much more. Works with most letter quality printers (Diablo, Qume, NEC, Juki, Brother, C. Itoh, Silver Reed, others).

"The best and least expensive method of dramatically improving the appearance of any WordStar text" - LIST

Disk version (CP/M, MS/PC-DOS) *automatically* modifies WordStar \$75 including manual. Manual only (100 pages - with full details for implementing PS using Install) \$25. *No* technical skill is needed. Text can be right justified. Printer does *not* require PS logic. Prices include shipping in U.S. NYS add tax.

Okay! My check is enclosed for \$..... (or charge my VISA/MC acct # exp).

Writing Consultants

Suite 243, 11 Creek Bend Drive - Fairport, NY 14450

1-800-828-6293 (in NYS 1-716-377-0130)

phones open 24 hours - dealers please call or write

Circle 698 on reader service card

Contemporary ComputerWear

DUST COVERS
FOR
THE IBM PC



Allure your IBM PC in style! **ComputerWear** is dust protection with class. Design features include select, woven fabric and embroidered emblem. Order now. Satisfaction guaranteed.

- ☐ **YES, PROTECT MY PC IN STYLE! SEND ME:** ☐ **CHECK**
 ___ Keyboard(s) \$16 ___ Monitor(s) \$18 ☐ **VISA**
 ___ Drive(s) \$18 ___ Printer(s) \$18 ☐ **MC**
 ___ 1pc Mon/Drive\$36 Add \$2.00 Shipping Total: \$_____
 (CA. Res. add tax)

Print Name: _____

Address: _____

City/State: _____ Zip _____

Credit Card #: _____ Exp. _____

Signature: _____



Contemporary ComputerWear Att: YT

1320 36th Ave./San Francisco, CA 94122 • 415/564-0506

IBM PC is a trademark of International Business Machines Inc.

Circle 276 on reader service card

ONE PROGRAM YOU CAN'T AFFORD TO BE WITHOUT!

INQUIRY...

- Covers all hardware, software, and accessories in your home, or in transit.
- Insured on a replacement cost basis
- All Risk Coverage including flood, quake, and breakage
- Covers damage to DP equipment from short circuit, blow-out, or other electrical damage or disturbance —including wiring
- Automatic coverage for newly acquired property up to 60 days
- Can be used for business or personal use or combination
- Even covers equipment leased or rented from others.
- Low \$50 deductible
- VISA or MasterCard accepted.

Now you can protect your investment with Broad Form, low cost protection from Markel.

Policy Limit	Annual Premium
up to \$2,500	\$22.50
\$ 2,501-\$5,000	\$32.50
\$ 5,001-\$15,000	\$47.50
\$15,001-\$25,000	\$62.50

(Higher limits are available upon request)

Call today toll free for immediate coverage or more information!



MARKEL SERVICE, INC.

5310 Markel Road, Richmond, VA 23230
1-800-446-6678 or 1-800-552-3408 (VA)

Circle 121 on reader service card

ADVANCED COMPUTER PRODUCTS

Serving Computer Professionals Since 1976

TOLL FREE 800-854-8230

IBM PC



★ COLOR SPECIAL ★ THE COLOR GRAPHICS CARD

(same designer as Colorplus Card)

PRICE \$269⁰⁰ BREAKTHRU! \$269⁰⁰
1 year Warranty

MULTI CARD II™ (exp. 0K-384K) \$199⁰⁰

(INTRODUCTORY OFFER)

Advanced Computer Product's best selling multifunction card for the IBM PC & XT (plus compatibles) now has been improved with expansion capability to a full 384K and at no charge an additional game port. You also get Print Spooler and Disk Emulation Software plus a full year SWAP-OUT Warranty at no extra charge. Why pay more when you can get the same function and performance as Quadboard II™ and AST Sixpak Plus™ for substantially less money. You compare! Try it at no obligation. 10 day no questions asked return privilege.

FUNCTION	Multicard II	Quadboard II	Sixpak Plus
Memory	0 to 384K	0 to 384K	0 to 384K
Parallel/Serial	Yes	Yes	Yes
Clock/Calendar	Yes	Yes	Yes
Game Port	Yes	Yes	No (\$50 list Opt.)
Software	Yes	Yes	Yes
Warranty	1 Year	1 Year	1 Year
ACP Price with 0K	199.00	229.00	229.00

EXPANSION MEMORY

- 64K Upgrade (Set of 9 64K RAMS) \$50⁰⁰
- 256K RAM's (256K x 1) \$79⁰⁰ ea
- 16K RAM's (16K x 1) 10/\$9⁹⁹
- 8087 CPU (Arithmetic Processor) \$199⁰⁰

IO/XT

(Serial, Parallel, Clock/Calendar) ... \$129⁰⁰

The most popular expansion card for the short slot of your IBM XT. All these functions on one card optimized to fit in one slot. 1 year warranty.

COLOR/GRAPHICS/COLOR/GRAPHICS

- Plantronics COLORPLUS™ \$399⁰⁰
- Hercules GRAPHICS CARD \$348⁰⁰
- Graphics X Software \$42⁰⁰
- Quadram QUADCOLOR I&II \$199/Call
- Scanoptik COLORGRAPHICS \$269⁰⁰
- Amdek MAI \$438⁰⁰
- Hercules COLOR CARD w/Par. port \$229⁰⁰
- Paradise MULTIDISPLAY \$378⁰⁰
- CONOGRAPHIC CARD \$895⁰⁰
- MA Sys PEACOCK \$299⁰⁰

IBM PC COMPATIBLE DISK DRIVES



- Tandon TM-100-1 Single Sided (160K) ... \$169⁰⁰
- Tandon TM-100-2 Double Sided (320K) ... 199⁰⁰
- Control Data 9409 Double Sided (320K) ... 224⁰⁰
- TEAC* 55B 1/2 high Double Sided (320K) ... 179⁰⁰
- Toshiba* 1/2 high Double Sided (320K) ... 169⁰⁰
- *IBM PC Mounting Hardware for 1/2 highs. 4⁹⁵
- Vista "Diskmaster" 5 1/4" & 8" Diskcontroller ... 169⁰⁰

HARDWARE

AST Sixpakplus w/0K(SPC)	\$229.00
Megapack II w/0K(SC)	229.00
I/O Plus II (CS)	115.00
Game/Serial/Parallel Options	35.00
Monographics Graphics Card	445.00
CHALKBOARD	Call
COEX IBM PC Extender Card	29.00
IBM PC Prototype Card	36.00
DAVONG Hard Disk Drives	Call
KENSINGTON PC Saver	39.00
KEYBOARD IBM PC Compatible	149.00
KEYTRONICS 5150/5151	199.00/Call
KOALA	96.00
KRAFT or TG	
IBM PC Joystick	59.00
Game Paddles	29.00
MICROSOFT Mouse	169.00
M&R PC/XT Exp Chassis (6 slots)	439.00
MOUSE SYS Mouse for PC	196.00
PERSYST Time Spectrum w/64K	289.00
PTI Back-up Power 200/400W	Call
QUADRAM Quadboard II w/0K	229.00
Quadlink (Apple Prog.)	479.00
Quaddisk (up to 72Mb)	Call
Microfazer MP64 w/64K	179.00
VISTA Multicard Plus 0K-384K	199.00
Maxicard w/64K (up to 576K)	229.00
PC Master (10 I/O)	329.00
Diskmaster (Floppy Cont.)	169.00
Dynaframe Hard Disk	Call
PC Clock I/O	129.00

PRINTERS/MONITORS

BROTHER HR-25 (23cps daisy)	Call
HR-1A (16cps daisy)	Call
COEX 80F/T (80cps)	Sale \$199.00
DYNAX DX-15 (daisy, 2-color)	529.00
DAISYWRITER 2000 (17cps)	1049.00
EPSON RX-80 (100cps)	299.00
FX-80/FX100	Call
NEC Spinwriter 3550	1698.00
OKIDATA Model 82/83	399.00/619.00
Model 84P/84S	919.00/989.00
Model 92P/92S	445.00/595.00
Model 93P/93S	769.00/899.00
SILVER REED EXP550 (17cps)	588.00
EXP770 (30cps)	770.00
STAR Gemini 10X (120cps)	309.00
Gemini 15X (120cps)	429.00
Delta 10/15 (160cps)	Call
TTX Model 1014 (12cps)	529.00
TOSHIBA 1350 Dot Matrix	1549.00
AMDEK Video 300G/A	145.00/155.00
Video 310A amber (IBM)	159.00
Color I (composite)	299.00
Color I Plus (earphn/nonglare)	329.00
Color II RGB (IBM) analog	449.00
Color II Plus	399.00
Color III RGB (IBM)	399.00
Color IV RGB (IBM) analog	779.00
BMC 12" Green-Low cost	89.00
PGS HX-12 RGB (690x240)	499.00
SR-12 RGB (690x480)	Call
MAX-12 Amber	Call
ZENITH ZVM-121 12" green	99.00
ZVM-134 12" RGB color	399.00

DISKETTES

DYSAN 5 1/4" SS DD	10/\$55	\$28
DYSAN 5 1/4" DS DD	10/65	36
IBM 5 1/4" SS DD	10/60	43
IBM 5 1/4" DS DD	10/65	47
VERBATIM 525-01 SS DD	10/45	20
VERBATIM 550-01 DS DD	10/55	29
MAXELL MD1 SS DD	10/50	22
MAXELL MD2 DS DD	10/60	32
Flip Storage Box 5 1/4" (80 disks)		18
BULK SPECIAL SS	10/25	16
With Sleeve and Box	100/195	149

IBM ACCESSORIES

COMPUABLE	
Keyboard/disk dust covers (set)	\$16.00
CURTIS Tilt/swivel Monitor ped.	43.00
PC Pedestal (IBM Mono)	58.00
PGS Quadchrome disp. Adapter	9.00
Vertical PC Stand	20.00
Mono Extension Cable	43.00
Keyboard Ext Cable	35.00
AC Plug Adpt (any mon. to PC)	8.00
EDP PROTECTION DEVICES	
The Lemon/Peach	39.00/63.00
The Orange/Lime	94.00/58.00
GILTRONIX SWITCH BOXES	
2 Way 8 Lines	90.00
4 Way 8 Lines	179.00
2 Way Centronics	199.00
RIBBONS	Each Dozen
Epson MX-80	5.75 59.00
Epson MX-100	10.95 120.00
Star Gemini 10/15	2.50 26.00
Okidata 80/82/83	3.95 44.00
Okidata 84/92/93	4.95 55.00
NEC 3550	11.95 135.00

MODEMS

BIZCOMP Model 2120 (Internal)	449.00
HAYES Smartmodem 1200	\$475.00
Smartmodem 1200B	
(w/Smartcom II)	418.00
Smartmodem 300	199.00
Smartmodem II	99.00
Smartmodem/IBM Cable	25.00
NOVATION Access 1-2-3	388.00

SOFTWARE

dBASE II/Friday
\$378⁰⁰/\$168⁰⁰

Condor
\$389⁰⁰

SuperCalc I/II/III
\$79⁰⁰/\$159⁰⁰/\$228⁰⁰

Multiplan Vers. 1.1
\$138⁰⁰

Microsoft Mouse/Word
\$288⁰⁰/\$238⁰⁰

Wordstar 3.3
\$258⁰⁰

Micropro Pro Pak
\$378⁰⁰

Rbase 4000
\$328⁰⁰

T. K. Solver!
\$268⁰⁰

PFS

File 88.00 Graph 88.00
Write 88.00 Report 78.00

Context MBA Call

VisiOn Call

Lotus 1-2-3 Vers. 1A
Call!

Bank Street Writer	58.00
Home Accountant Plus	88.00
Sideways	48.00
Volkswriter	114.00
Knowledge Man	274.00
Crosstalk XVI	108.00
Multimate w/spelling	348.00
Compuserve Subscription	38.00
Executive Info Serv	78.00
Vidtex Software	58.00
Executive + Vidtex	118.00
Source Subscription	68.00
Source w/source link	108.00

Send for Free
Catalog
96 Pages of
Selected Values

TERMS: We accept VISA, MC, MD, Cashiers and Personal checks. School and Company PO's. We do not charge your card until we ship. Personal checks require drivers license and credit card #. No Surcharge Added on VISA or MC. COO's over \$500 require 20% deposit with order. Add 3% shipping and handling for UPS. We offer same-day shipment. Prices subject to change without notice. We reserve the right to substitute manufacturer. We are not responsible for typographical errors. Retail Sale Prices May Vary. IBM™ trademark of International Business Machines. Quadboard II™ trademark of Quadram Corp. Sixpak Plus™ trademark of AST Research Inc.

MAIL ORDER: P.O. Box 17329 Irvine, CA 92713

Retail: 1310 E. Edinger, Santa Ana, CA 92705
(714) 558-8813

542 W. Trimble, San Jose, CA 95131
(408) 946-7010

TOLL FREE

800-854-8230

TWX
910-595-1565

WE STOCK CABLES • RIBBONS • DISKETTES • SPARE PARTS

Circle 2 on reader service card

1984 CATALOG AVAILABLE SOON • 64K UPGRADE KITS - ONLY \$50⁰⁰

64K UPGRADE - ONLY \$50⁰⁰ • CUSTOM CABLES AVAILABLE

It's Simple. . .
CALL AND SAVE MONEY

COMPUTERS

SANYO

COLUMBIA
DATA PRODUCTS INC.

TRS-80
COMPUTERS



Franklin
Computer

EQUIPMENT

Hayes

Novation

AMDEK

AST

QUALTRAM

PGS

Verbatim

Ven-Tel

PRINTERS



EPSON

OKIDATA

Panasonic

OKI

C. Itoh

MANNESMANN
TALLY

Tanstar

TOSHIBA
TOSHIBA AMERICA, INC.

star

RITEMAN

daisywriter

Diablo



Orange Mikro

M

INNOVATIVE CONCEPTS

FREE

Catalog Upon Request

Call For Your
Wholesale Prices

Since 1978

**Micro Management
Systems, Inc.**

2803 Thomasville Road East
Cairo, Georgia 31723
(912) 377-7120

1-800-841-0860



Man's Best Friend

Circle 386 on reader service card

After the Party's Over...

You can continue to improve your skills
with **SOLOBRIDGE** on your IBM PC, PC jr.,
PC workalikes, or Apple IIe.

SOLOBRIDGE begins where other bridge games end, giving you
the opportunity to play against hands created by experts.

SOLOBRIDGE will increase your overall bidding strategy and
playing skills by displaying the experts' point of view on each trick,
along with an explanation of the most advantageous line of play.

SOLOBRIDGE includes 50 hands expertly designed to help you
improve your skills in the game you already love. So, when
everyone else has gone home, let **SOLOBRIDGE** give you a hand.

ADDITIONAL HANDS AVAILABLE:

Series B (32 Hands) - For advanced players

Series C (48 Hands) - For intermediate and advanced players

Prices are: Solobridge - \$60.00 Series B - 15.00 Series C - 19.00

Special **INTRODUCTORY OFFER** — Return your registration card
postmarked by August 31, 1984, and receive Series B free of charge.

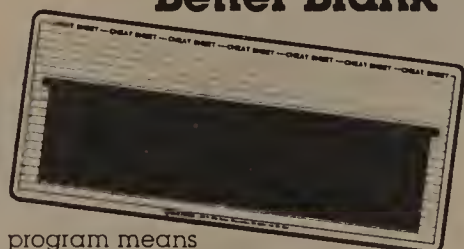
SILVERMAN ASSOCIATES

1700 Shattuck Ave., • Berkeley, CA 94708 • 415/644-2954

Circle 752 on reader service card

Why Blank "Cheat" Sheets? Because They're Better Blank

You've got the best computer in the world, and lots of software to run on it. One problem. Unless you work with these programs everyday, it's hard to keep all those commands straight. "F5" in one program means one thing, and "F5" in another program means something else. A few companies offer a die cut sheet that attaches to your keyboard with **all** the commands of one program printed on it. Great idea, unless you only need a few easy-to-find "hints," or you need them for 10 or 20 programs. Our solution? Simple. A pack of 12 lined cards, die cut to fit your keyboard and just waiting to be filled with those problem commands **you** forget most often. Simple? Yes, but effective. Now you can have **all** your program commands right at your finger tips on YOUR VERY OWN, custom designed "cheat" sheets. Great for offices and schools. Order a couple packs today!



Please send me the following:

Qty.	Item	Price
___	Sets of 12 Keyboard Cheat Sheets @ \$17.95	\$
___	2 Packs (24 Sheets) for \$29.95	\$
___	Shipping and Handling	\$ 2.00
___	5% State Tax (WI Residents only)	\$
___	TOTAL ENCLOSED	\$
☐	Please Charge to:	
☐	MasterCard	
☐	VISA	
Number	Expires	
SHIP TO: Name		
Address		
City		
State/Zip		

Dealer Inquiries Invited

Bytes & Pieces, Inc.

550 N. 68th Street
Wauwatosa, WI 53213
414/257-3562

Circle 9 on reader service card

KEYSWAP™ = PROKEY* + 10 NEW FUNCTIONS

KEYSWAP is the most advanced Macro Processor
available for the **IBM PC**** - including **ALL** of
PROKEY's* functions and many more!

KEYSWAP creates yet another dimension in
USER FRIENDLINESS.

In addition to the standard
macro features, the user can:

Create custom Help Menus that can
be recalled from within any program.

Create "lessons" that can be played back at
variable speed for tutorial or demo purposes

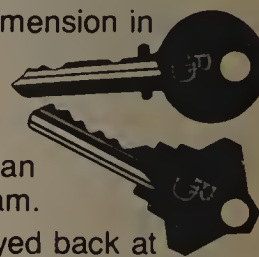
Create **AND MODIFY** macros at ANY time without
affecting the applications program

Create a single macro definition as large as 64K

Redefine ANY keys (i.e. shift) or define ANY macro
character

IMAGINE: automatic time and date display; fixed
and variable definition fields; audible feedback on
toggle keys; alternate cursor control selection; and
many more features!

KEYSWAP - State of the Art keyboard utility software.



PRICE

\$119.00 (Money back guarantee)
MA res add 5% s/s tx

FOR ORDERS OR INFO CALL OR WRITE
(Call for special introductory offer)

RICKERDATA

PO BOX 998 MELROSE, MA 02176 (617) 662-0856

MC & VISA ACCEPTED

*Registered Trademark RoseSoft **Registered Trademark IBM

Circle 160 on reader service card

August 1984

MORE POWER... MORE SPEED...



C86, the leading C compiler for PC-DOS and MS-DOS is better than ever. 50% faster execution, highest portability, floating point math, strong support, and much more. Still only \$395.

FOR MORE INFORMATION OR TO ORDER CALL:

800-922-0169

Technical Support: (201) 542-5920



COMPUTER INNOVATIONS

980 Shrewsbury Avenue, Suite WLD
Tinton Falls, NJ 07724

C86 is a trademark of Computer Innovations, Inc. MS-DOS is a trademark of Microsoft. PC-DOS is a trademark of International Business Machines.

Circle 406 on reader service card

Your Best Connection Datec PAL Plus



Plug-In Modem for the IBM PC and XT

The Datec PAL Plus has all the features you need in a modem: • 0-300 or 1200 bits per second • Autodial/Autoanswer • Touch-Tone or rotary pulse dialing • On-board monitor speaker with volume control.

Plus. An extra, *independent* RS-232C port.

Plus. A one-slot-only, no-hassle fit in the PC or XT.

Plus. CROSSTALK XVI communications software. Included free.

So add it up. Then make your connection with the Datec PAL Plus Modem. Your best connection.

Datec, Datec PAL, Your Best Connection © Datec, Inc. CROSSTALK XVI © Microstuf, Inc. IBM © International Business Machines Corp. Touch-Tone © American Telephone and Telegraph.

DATEC®

Datec, Incorporated, 200 Eastowne Drive, Suite 116
Chapel Hill, NC 27514, 919-929-2135

Circle 579 on reader service card

WANTED

"Buyers," & We'll pay the shippin'

• CALL FREE (800) 654-4058 •

"Call For Reduced Prices At Various Quantities"

Verbatim.

5 1/4" sin-side dbl-den.	2 40
5 1/4" dbl-side dbl-den.	3 45
5 1/4" sin-side quad	3 20
5 1/4" dbl-side quad	4 40
8" sin-side sin-den.	2 75
8" sin-side dbl-den.	3 05
8" dbl-side dbl-den.	3 40

Head Cleaning

Kits... **5 20**

Refills... **9 55**

Prices per ea.
10 per box

Dysan.

5 1/4" sin-side dbl-den.	3 20
5 1/4" dbl-side dbl-den.	4 20
5 1/4" sin-side quad	4 45
5 1/4" dbl-side quad	4 95
8" sin-side sin-den.	3 45
8" sin-side dbl-den.	4 45
8" dbl-side dbl-den.	4 95

We Stock
"Bulk-Packed"
Diskettes

3M Scotch

5 1/4" sin-side dbl-den.	2 20
5 1/4" dbl-side dbl-den.	3 20
8" sin-side sin-den.	2 35
8" sin-side dbl-den.	2 95
8" dbl-side dbl-den.	3 90



Disk Minder
• Smoked Plastic
• Holds 75 Disks

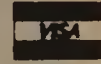
16 75 ea

Dealer Inquiries
Welcomed



P.O. Box 1674
Bethany, OK
73006

**Diskette
Connection™**



(Continental U.S. only Add 3% on orders under 40.00)

NEW!

BZZZZ
WHIRRR
CLICK-CLICK
BEEP!

MACHINE
LANGUAGE??

BRIDGE THE GAP!

BETWEEN COMPUTERRESE AND THE NON-TECHNICAL HUMAN INTELLECT.

You've experienced the times when you felt you were intimidating your listeners with a complexity of technoid phraseology. Or felt intimidated yourself by a knowledgeable speaker. Quite possibly you've been held captive by user's guides, software instructions and reference manuals.

Introducing MICROSPAN, the solution to Computer Ignorance!

Here's your chance to REALLY dazzle 'em. Just slip a copy of MICROSPAN into any unsuspecting user's IBM-PC and watch the results. You'll be amazed to see even the most sophisticated Technophile reduced to a blundering mass of disbelief. Sure to liven any user's group; Your software library is incomplete without it.

MICROSPAN \$34.95 + \$2.00 Shipping
California residents add 6.5% sales tax.

VISA AND MASTERCARD ORDERS:

CALL TOLL FREE 800-227-1617 ext. 205

In California call 800-772-3545 Extension 205

Or send Personal Check or Money Order to:

BMB SOFTWARE SPECIALTIES

333 Cobalt Way Suite 106 Sunnyvale, California 94086

Name _____

Address _____

City, State _____

Zip _____

IBM is a Trademark of International Business Machines Corp.

Circle 55 on reader service card

*IBM PC Compatible



E-PROMS — CALL! Lowest Prices Anywhere

*4164-150P \$530
 *4164-200/250 515/469
 6116-P3 599
 *IBM Ex/Color Boards... CALL
 IBM PC, XTs ... Below Market/
 CALL

Disk Drives: (F.O.B. Tampa)

*TM-100-2..... 21924
 *Half-Heights - 2 21924
 *10 mb Win 1,38547

(MS/DOS 2.0/IBM plug in & go)

Add \$2.95 shipping to all orders • Prices subject
 to change • P.O.'s on approval • C.O.D. OK • All
 new, no surplus, no seconds

4920 Cypress St., Tampa, FL 33607
 In FL and for info, call 813-875-0299

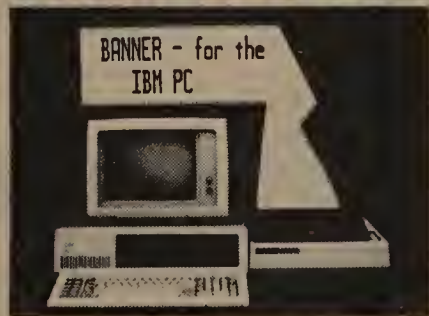
FOR ORDERS ONLY, 800-237-8910



8 AM-8 PM EDT

Circle 626 on reader service card

BANNER



Print banners on your IBM PC* with the
 BANNER program. Design your own fonts
 with character design editor (included)!
 Requires 64K, DOS, 80 col display, one disk,
 and printer. \$39.95 (Visa, MC accepted)

To order call toll free (24 hrs/day):

800-824-7888 ask for operator 989
 (In Alaska or Hawaii call 800-824-7919)

Sam Wilson & Associates
 P.O. Box 37085 Houston, TX 77237
 (713) 785-7830

*Trademark: International Business Machines Corp.

Circle 506 on reader service card

3740

Diskette Exchange Software

Access IBM data processing equip-
 ment through the 8" diskette and
 avoid the problems of serial com-
 munication.

By adding an 8" drive to your PC
 and using our **REFORMATTER**®
 Conversion Software, you can ex-
 change diskettes with IBM's 3741,
 3742, 3747, 5110/20, Series 1, System
 3/32/34/36/38/360/370 and 43xx and
 non IBM machines that read and write
 the IBM 3740 diskette.

Available under PC-DOS or
 CP/M-86 at \$350 from MicroTech
 Exports, 467 Hamilton Avenue, Palo
 Alto, CA 94301. Tel: 415-324-9114
 TWX: 910-370-7457: MUH-ALTOS.

Circle 475 on reader service card

EMULATE HP TERMINAL WITH YOUR IBM PC

Now your IBM Personal Computer can be
 used as a Hewlett-Packard 26XX family
 terminal. Instead of just a terminal, you'll
 have a general purpose microcomputer.
VDTE 2 is the powerful, easy to use
 terminal emulation program that provides
 the features you need!

HP2624, HP2648 and DEC VT52 modes

HP2624 block/format mode

Eight displayed softkeys (program controlled)

Subset of HP2648 vector graphics

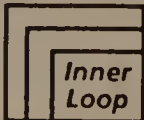
Supports both serial ports simultaneously

Fourteen pages of off-screen scrolling memory

Ten speeds include 300, 1200 and 9600 baud

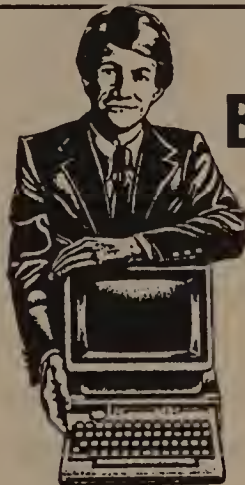
General purpose file transfer between PC and host

Price: \$200. Visa and MasterCard welcome.



Inner Loop Software
 5456 McConnell, Ste 120
 Los Angeles, CA 90066
 (213) 822-2800

Circle 624 on reader service card



NAME BRANDS

LOW PRICES

Computers
 Software
 Accessories

Call for FREE sale brochure or send
 \$3.00 for informative, full-line catalog.

systems mart®

107 W. North Ave., Northlake, IL 60164
312/562-6061

Circle 185 on reader service card



ZyINDEX™ can be your "lifesaver"!

INDEX SEARCH RETRIEVE

Revolutionary New File
 Content Retrieval System
 Auto-Indexing Eliminates Key Words

ZyINDEX™ \$295

ZyLAB™ Corporation

233 East Erle
 Chicago, IL 60611
 312/642-2201

Circle 704 on reader service card

STATPLAN

\$49.95

Statistical Software for IBM PC Computers

- Easy to use. Menu driven. Full-screen data entry, editing, and transformation
- Basic statistics, autocorrelation, ANOVA
- Multiple regression with residual analysis; automatic forecasting; graphs of residuals, forecasted and actual values
- Cross plots, histograms, time series plots
- Interface with Lotus 1-2-3 and VisiCalc

THE FUTURES GROUP

76 Eastern Blvd
 Glastonbury, CT 06067 (203) 633-3507

Circle 532 on reader service card

XT / 370 USERS

Async Host Program Download Facility

- Allows XT/370 user to down-
 load VM/CMS programs & utili-
 ties via a Remote Async dial-up
 connection.
- Eliminates the need for a co-ax
 connection to a 3274 Type B
 adapter.
- Complete instructions for use.
- Compatible with most Async
 communications software.

For immediate shipment send \$125 to: **DKI**

Requires IBM PC XT/370, 209 Garden Lane
 Async Adapter, and Longwood, FL 32750
 communications software Telex: 293985 DKI UR

Circle 765 on reader service card

BIG DISCOUNTS! SEND FOR FREE CATALOG

AST MEGAHAUS VISICORP MICRO
 VERTEX PYXEL APPLICATIONS
 STB CONTROL DATA HAYES
 OMEGA NORTON ROSESOFT
 INFOCOM INTEL PRINCETON
 QUADRAM MORGAN AI
 WARE HARVARD SOFTWARE
 HAYDEN ELEPHANT JAX TAXAN
 FINANCIER HARCO BRACE SPIN-
 NAKER CABLES SOFTWARE ARTS
 DLM DAVIDSON WARE ARTS FUNK
 CONTINENTAL STERRA ON-LINE
 AVALON HIL NOGRAM SUBLOGIC
 LEARNING SSI ATAR AMDEK
 U.S. ROP FRIENDL MICRO-
 STUF WORX FOX ELLER
 ASH TATE GIS TRANSFECTOR
 MIC IM COMPUCABLE HARVARD
 A IATES INNOVATIVE CONCEPTS
 MOST COUNTERPOINT

1830 AVENUE K PLANO, TX. 75074
(214) 424-3582

Circle 731 on reader service card

SAVE ON

DISKETTES

\$180 ea. 5 1/4" SSDD Qty. 20 **\$235** ea. 5 1/4" DSDD Qty. 20

5 1/4" SSDD-96TPI \$2.49 ea. 5 1/4" DSDD-96TPI \$3.25 ea. Boxed in 10's with Tyvek sleeves, reinforced hubs and labels.

DISKETTES FOR MACINTOSH & HP-150 AT TERRIFIC SAVINGS!

3 1/2" Memorex \$3.99 ea.

See our big ad in this issue for other great values!

Shipping: 5 1/4" or 3 1/2" DISKETTES—Add \$3.00 per 100 or fewer diskettes. Payment: VISA and Mastercard accepted. COD orders only, add \$3.00 handling charge. Taxes: Illinois residents, please add 8% sales tax.

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

Nationwide: 1-800-621-6827

Illinois: 1-312-944-2788

Hours: 9AM - 5PM Central Time

Minimum Order: \$35.00

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

BETTER THAN FREE!

CATALOG & BUYERS GUIDE FOR THE IBM PC

Call

800-345-4706

California

818-352-3253

MICRO MATCH Quality Products Personal Computer

10049 Commerce Ave. Tujunga, CA 91042

Circle 619 on reader service card

GREAT DISKETTES Super low prices SYNCOM

The low priced, high quality diskette with a LIFETIME WARRANTY. Packed in polybags of 10 with Tyvek envelopes, labels and reinforced hubs. One of the best buys we've seen.

\$139 ea. 5 1/4" SSDD QTY. 20 **\$185** ea. 5 1/4" DSDD QTY. 20

OTHER GREAT VALUES:

DISKETTE 70—Holds 70 5 1/4" diskettes in dust free safety \$14.95 ea. + \$3.00 Shpg.
DISK CADDIES—Flip up style holds 10 5 1/4" diskettes \$1.65 ea. + .20 Shpg.

\$15.00 Bonus Offer!

For the lowest priced, highest quality diskettes, storage cases, printer ribbons and paper products, send for our catalog. FREE with your order: \$1.00 otherwise. BONUS! Every catalog includes \$15.00 worth of bonus coupons.

Shipping: 5 1/4" DISKETTES—Add \$3.00 per 100 or fraction thereof. OTHER ITEMS: Shipping charges as shown in addition to diskette shipping charges. Payment: VISA or MC. COD orders, add \$3.00. Taxes: Illinois customers, please add 8%.

Nationwide: 1-800-621-6827

In Illinois: 1-312-944-2788

Minimum Order: \$35.00

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE!

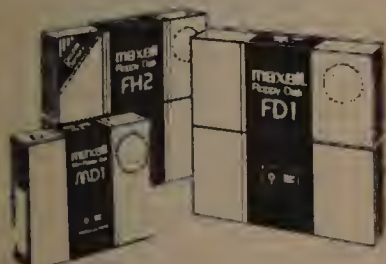
DISK WORLD!

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

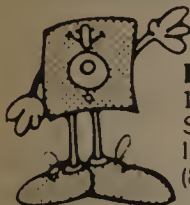
SYNCOM

Maxell Floppy Disks

The Mini-Disks with maximum quality.



Dealer inquiries invited. C.O.D.'s accepted. Call FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805) 543-1037.

Circle 576 on reader service card

	List Price	*Evaluation Unit
Basic System Model PC-100**	\$895.00	\$795.00
Complete System (128K) Model PC-100	\$1995.00	\$1850.00

Everything for PC and Compatibles

Computer Case with Power Supply & Fan (65 WATT)	\$299.00
Computer Case w/o Power Supply & Fan	\$149.00
Keyboard	\$149.00
Half Height DSDD Disk Drive (360K)	\$189.00
Disk Controller	\$99.00
Monochrome Graphics Board	\$299.00
Color Display Board	\$299.00
Hard Disk (w. Software, Controller, Case, Power Supply) 10Mb	\$1295.00

Note: *Special Introductory Offer Expires Sept. 30, 1984
**Basic System PC-100 Includes Mother Board with 64K Expandable to 256K, Power Supply with Cooling Fan, Low Profile 96-Key or 83-Key IBM Compatible Detached Keyboard, 2 Serial Ports, 1 Parallel Port, and Metal Case with Hardwares.

MACROTRON SYSTEMS CORP.

8147 Delmar Blvd. • St. Louis, MO 63130

Tel: (314) 721-3356

Terms: Prepaid check or money order, Visa or Mastercharge

Circle 652 on reader service card

LOW PRICE-HIGH QUALITY PRODUCTS FOR PC's

MAXELL 5 1/4" SS/DD	23.90
DS/DD	35.90
DYSAN 5 1/4" SS/DD	29.90
DS/DD	39.90
IBM D-BASE II	CALL
MICROSOFT WORD	329.
WORD/MOUSE	249.
CYMA SOFTWARE	309.
SUPER CALC 3	CALL
R:BASE 4000	229.
SMARTMODEM 1200B	329.
SMARTMODEM 1200	439.
WORD STAR PRO PACK	469.
LOTUS 123	389.
AST SIXPAK PLUS 64K	329.
	269.

WE CARRY A COMPLETE LINE OF PRODUCTS CALL FOR OUR FREE COMPUTER CATALOG

DATA BASE CO.

9778 Katella Ave. #106

Anaheim, CA. 92804

(714) 534-8140



CALL CREDITED TO ORDER. CA. RESIDENTS ADD 6% TAX

ADD 2% SHIPPING \$3 MINIMUM

Circle 718 on reader service card

Get a PC of the Action with a PC World Action Ad!

Toll-free: 800/872-7800
(Calif: 800/872-7808)

This could be your ad!
Now you can place a low-cost, high-response ad in *PC World*.
Get your product the special rate and special attention it deserves.
Call your *PC World* Advertising Rep now and ask for your Action Ad.



SAVE MORE THAN EVER ON

3M Scotch® DISKETTES

LIFETIME WARRANTY!

\$185 ea. 5 1/4" SSDD (744) Qty. 20 **\$235** ea. 5 1/4" DSDD (745) Qty. 20

5 1/4" SSDD—96TPI (746)	\$2.60 ea
5 1/4" DSDD—96TPI (747)	\$3.25 ea
8" SSDD (740)	\$2.05 ea
8" SSDD (741)	\$2.50 ea
8" DSDD (743)	\$3.10 ea

Shipping: 5 1/4" DISKETTES—Add \$3.00 per 100 or fraction thereof. 8" DISKETTES—Add \$4.00 per 100 or fraction thereof. OTHER ITEMS: Shipping charges as shown in addition to diskette shipping charges. Payment: VISA or MasterCard. COD orders only, add \$3.00. Taxes: Illinois customers, please add 8%.

Hours: 9 AM-5 PM Central Time

For fast service call

Nationwide: 1-800-621-6827

In Illinois: 312-944-2788

DISK WORLD!

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

Authorized Distributor Information Processing Products **3M**

PC World Directory

PC World Directory is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.

FORMAT: The standard format includes a product ID, a 300-character descriptive ad, and the company name, address, and telephone number.

Advertisers may choose among categories already being used or may create their own. Display advertisers can cross-reference their current ad to the PC World Directory for increased exposure at low cost.

RATES: Listings are accepted for 3-time consecutive insertions at a rate of \$420 (\$140 per issue). We are now offering a six-time insertion, 15% discount contract for a total of \$714 (\$119 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.

DEADLINE: For space reservation deadlines, contact a PC World Directory sales representative at 415/861-3861. Please send copy and prepayment to: PC World Directory, 555 De Haro Street, San Francisco, CA 94107.

Accessories

Computer Covers

PC Covers & More...

Protect your PC & XT investment with our sturdy, clear anti-static vinyl dust covers. 2 piece set. (One covers monitor/system unit, one covers keyboard.) Only \$15.95. \$1 s/h. Visa/MC/chk. Printer & other covers avail. Call/write to order. Free catalog of unique & useful accessories. SGW Enterprises, Inc., 722-J Genevieve St. Dept. W, Solana Beach, CA 92075, 619/755-8324

Furniture

Smart Desk/Cover-Ups

The Smart Set ergonomically designed wood-grain desk & printer cabinet. Fits most decor. Many features: closeable, several shelves, easy to use. Protects your equipment & hides the mess. Prices start at \$119. Ultrasuede dust covers from \$29.95. Visa/MC accepted. The Furniture Byte, P.O. Box 1757, Longview, WA 98632, 800/426-5301, 206/423-7277

Free Ergonomic Catalog

Ergonomic Home furniture designs from over 20 national manufacturers, some avail. for the 1st time. Furniture styled to fit into your home without turning it into an office. Ergonomic designs assure comfort & productivity while reducing fatigue. Compare our prices & order with Visa/MC. Never a s/h charge. 30 day unconditional guarantee. Interior Design Systems, 3641-W St. Mary's Place NW, Washington, DC 20007, 202/333-7502

Affordable PC Stand

Solid oak stand for your IBM PC. Keybd. fits under processor for more workspace. Protects keybd. from dust & spills. More reach for keybd. cord. Unique design allows stand to fit under base of processor w/easy access to keybd.

Satisfaction gtd. Send check, \$18 + \$2 s/h for each unit. CA res. add sales tax. Dee Enterprises, P.O. Box 534, Pleasanton, CA 94566, 415/846-0154

Nonglare Screens

SDC Antiglare Screen

Reduces eyestrain by eliminating glare from reflected light & by increasing display contrast. Tough synthetic optical mesh in a sturdy aluminum frame. Custom sizes to fit most monitors. Installs in moments with velcro. IBM PC Screen, \$39.95 postpaid. 30 day money back satisfaction guarantee. Visa/MC. Capitol Sales Company, 13740-J2 Research Blvd., Austin, TX 78750, 800/531-5273, 512/250-8757

Printer Enclosures

Oak Printer Enclosures

Functional, beautiful, & at grand opening prices. Use a telephone at your work station while you print. Brass hinged clear acrylite lid keeps printer dust free lessening costly maintenance. Danish oil finish requires only dusting.

- Epson MX-FX-80, \$79.
- Epson MX-FX-100, \$119.
- NEC 3550, \$149.

Add \$5 postage (CA res. add 6½% tax). Chk/MO/Visa/MC. Dealer inquiries invited. Acoustics by Cliff, P.O. Box 1124, Union City, CA 94587, 415/471-1996

Supplies

Touchdown™ Keytops

Full size keytops enlarge major control keys on IBM PC, PC/XT, & PC Portable; IBM 5291 Display Station, & PC compatibles: COMPAQ, Columbia 1600N, Corona, Eagle Spirit, Qubie & Key Tronics 5150. A "genuinely helpful" productivity tool (Jim Seymour: *Microbusiness*). \$18.95. (U.S. add \$2, intl. \$3.50 s/h) Color: black or IBM grey. Hooleon Company, Dept. WD—P.O. Box 201, Cornville, AZ 86325, 602/634-4507

• Computer PAPER •

Letter Quality, Letter Size, 20 lb. weight, Continuous Forms with CLEAN BREAK PERFORATION, 540 sheets, First Quality GUARANTEED. Only \$7.95, tax included. Add \$2 shipping & handling. Continental USA only. Make check payable to: DVR Distributing, 20993 Foothill Blvd. #724, Hayward, CA 94541, 415/886-6171

DISKTABS™

DISKTABS™ reduce errors & provide a safe way to label & handle diskettes. DISKTABS™ extend out the drive slot so you can see diskette name. 5 colors make filing easier. \$1.99 for 10, one color. \$9.50 for 50, five colors. Dealers invited. \$1.50 shipping. Choose yellow, orange, green, blue, purple. LDW Co., 38211 Logan Dr., Fremont, CA 94536, 415/792-1531

Business Opportunities

Medical/Dental Franchises

Software development company needs to establish dealers. Open item accounts receivable systems will print patient statements, all third party insurance claims, patient & clinical recall, day sheets, financial & statistical reporting for the medical office. Installed & supporting over 75 medical offices nationwide. MTA Medical Systems, 4825 Hefffield Circle, Syracuse, NY 13215, 315/488-1518

Computer Repair

IBM Board Repairs

Repairs for PC, XT. An alternative source of professional circuit board and subassembly repair available through PC dealers.

Lower prices and faster turnaround, utilizing Automatic Test Equipment (ATE), typically 5 days in-house. From keyboards to power supplies. Have your dealer contact: *Unitrace Incorporated*, 3350 Scott Blvd. #20, Santa Clara, CA 95051, 408/727-7573

DEC & PC/XT Repair

We repair DEC & IBM PC/XT computers, peripherals & disk drives. We offer a 5-day or emergency 1-day service along with a 120-day warranty & extremely low prices. We have been repairing computers for over 7 years. The next time you need repair try us! *Electronic Service Specialist*, N92 W14612 Anthony Dr., Menomonee Falls, WI 53051, 414/255-4634

Computers

IBM PC/XTs @ 20% Off

Also Tava PC clone w/2 drives, 128K, hi res mono display, 3 ports, \$1950. Tallgrass at -20%. 80 CPS dual feed, bi-directional printer, \$325. All boards for IBM. Call for Macintosh, IBM PPC. FULL WARRANTY DEALER INQUIRIES INVITED PC—Direct, P.O. Box 1788, Darien, CT 06820, 800/227-1032, 203/328-0036

Battery Powered!

SHARP PC-5000 Commuter Computer 8-line by 80-column LCD display, 128K RAM, 128K bubble storage, MS-DOS 2.00 & BASIC in ROM, SuperWriter & Comm. Ideal for the executive on the move & the engineer in the field. Weighs only 10 pounds. Disk drives, built-in printer/modem options! Prices start at \$1695. *Excellonix*, 7180 Woodrow Wilson Dr., Los Angeles, CA 90068, 213/650-5754

Consultants

California

Advance to Vance

A micro is still a computer! Let us save you time & money. We offer user-needs analysis, hardware & software selection, training, custom programming w/ dBASE II & 1-2-3, networking, telecommunications, etc. We are data processing professionals specializing in IBM PC systems integration. *Vance Info Systems*, 2818 Clay St., San Francisco, CA 94115, 415/922-6539

MicroTrader Newsletter

We offer comprehensive micro-computer services & consulting designed to simplify your life. Our basic newsletter service provides noiseless & concise reading. You'll find abstracts, education & public domain software. Also, gain access to our multiple data bases. Send \$3 for special issue or \$26 for one year service. *MicroTrader*, P.O. Box 590607, Dept. C, San Francisco, CA 94159, 415/845-2258

IBM PC Consulting

We specialize in business applications of the IBM PC. We provide software consulting, custom programming, on-sight training & support. We work with people who have little or no computer experience. Let us help you with *Wordstar*, 1-2-3, dBASE II, or any other business program for the IBM PC. *Balo Computer Services*, 4333 Price St. #203, Los Angeles, CA 90027, 213/665-4677

CompuSult

Now you can be assured that a qualified computer technician is available to speak with you about your computing questions. *CompuSult* is a computer consultant's agency. We can provide you with a specialized computer consultant who will zero in on your comput-

ing requirements & describe them to you in plain English. *CompuSult*, 808 N. Kenter Ave., Los Angeles, CA 90049, 213/472-2568, 415/929-8780 (No. CA)

National

City & County Gov't.

MIS firm specializes in micro-computer: consulting, seminars, systems, dBASE II programming & training for: city manager, police, fire, court, clerk, finance, P & R, personnel, roads, purchasing, CD, word processing & others. Call or write: *IDS*, Ron Jones, 1109 E. Carmen St., Tempe, AZ 85283, 602/838-3659

New York

Micro-mainframe Prog.

Our experience ranges from IBM mainframe (CICS) down to IBM PC. Services provided are: software search & analysis, custom programming & user training, support. *GAA, Inc.*, P.O. Box F, Deer Park, NY 11729, 516/586-8615. Telex 7517350 GAA USA UD

Disk Conversion

disk/CONVERT/software

At last—a program that ends many 5" disk conversion problems. *CONVERT* runs on most MS-DOS machines. It reads, writes & formats disks for over 28 different CP/M systems & Epson with Valdocs. \$99. MC/Visa accepted. Dealer inquiries invited. *Selfware, Inc.*, 3541 Chain Bridge Rd. 8A, Fairfax, VA 22030, 703/352-2977

micro/VERSAL™

Package to read, write, and format 20 plus CP/M formats, plus DUMP utility, file append, user definable formats & sector by sector retrieval—\$79. *COED™* full screen editor has MACRO commands, definable keys, multiple files, more! \$34. Runs on IBM PC or Z-100 (PC-DOS/Z-DOS). Check/MC/Visa. Call/Write. *Advanced Software Technologies*, 417 Broad St., Bloomfield, NJ 07003, 201/783-7298

Disk Copy Service

Superior Disk Copying

Allenbach created the industry, & we've since been imitated—but never duplicated. Copies supplied on OEM quality Allenbach LIFETIME GUARANTEE diskettes, now avail. in a variety of colors! Virtually all formats & systems. Copy protection, serialization, downloading & packaging avail. Rapid delivery on 100 to 1,000,000 copies. *Allenbach Industries, Inc.*, 2101 Las Palmas Dr., Carlsbad, CA 92008, 800/854-1515, (CA) 619/438-2258 collect

Diskette Duplication

Complete high-quality diskette copy service available in most formats, 3½", 5¼" & 8". Other services: diskette sales, protection, serialization, private label, labeling, packaging, shrink wrap, drop shipping, editorial, typeset & printing. 10 - 5,000,000+ copies. *Hoffman Computer Products*, 1720 Flower Ave., Duarte, CA 91010, 213/303-1571

Quality, Service, Speed

Quality duplication of your software on lifetime guaranteed diskettes using state-of-the-art equipment. We service virtually all formats & systems. Formatting, copy protection, serialization, & packaging available. Rapid turnaround & complete satisfaction guaranteed. *USLIFE Systems*, 1380 River Bend Dr., Dallas, TX 75247, 214/637-1179

A Decade of Service

Guaranteed fast turnaround for duplication and formatting on high quality OEM diskettes. Virtually all formats: IBM PC, Commodore, Apple + many more. Serialization, copy protection, custom packaging, shrink wrapping, drop shipping available. Personalized service is our specialty. *Computer Media Products, 5482 Complex St. #110, San Diego, CA 92123, 619/565-7802*

Diskette Doubler

Disk Doubler Kit

Double your present media storage capacity & SAVE 50% on future disk purchases. Converts FLOPPY DISK to FLIPPY in less than 1 minute. Kit comes complete with EASY TO FOLLOW INSTRUCTIONS. Use with any 5.25 single-sided-disk. Pays for itself SAME DAY! #ETCDD ONLY \$19.95 ea. \$2 s/h. MC/Visa/MO/COD (+ \$1.85)/chk. *Magnetics, Inc., P.O. Box 98, South Grafton, MA 01560, 800/334-DISK, 617/839-4404*

Hardware

Add-On Boards

AST/Maynard/Quadram

AST MegaPlus (64K) \$265, Six-Pack (64K) \$265. I/OPlus \$114. Extra Parallel, 2nd serial or game, \$35. MAYNARD Disk Controller, \$159. Sandstar Series, \$Call. QUADRAM Quadboard, \$265. Quadcolor I, \$199. HERCULES card, \$349. Set of nine 64K chips, \$55. HAYES modems, \$Call. *VLM Computer Electronics, 10 Park Pl., Morristown, NJ 07960, 201/267-3268*

No Slot Memory Upgrade

Let us install up to 256K RAM on your EXISTING SYSTEM BOARD using NO SLOTS. We improve your IBM PC so it can address the 64K RAM chips. 256K, \$335 (expandable & warranted). DO-IT-YOURSELF KITS, PC-KPC, \$69.95. With assembled no slot PC Board, \$99.95. 64K-RAMS (\$5.85 ea). Add-MEM, 22151 Redwood Rd., Castro Valley, CA 94546, 415/886-5443

256K Expandable Mem

64K-256K User Expandable (Socketed) Parity Memory, Precision Delay, Line Timing, Switch Selectable Start Address on 64K Boundaries anywhere in 1M Address Space, Hold-Down Bracket & Card Guide. 1 year warranty. Fully tested memory board, \$98. RAM 64K increments, \$52 ea. (9 64K chips, 200ns). Call for latest prices. *Ontrax, Inc., P.O. Box 368, Oakhurst, NJ 07755, 201/244-2302*

Voice I/O for IBM PC

Talk back to your PC! Expansion board takes voice input, stores on disk, gives high fidelity playback. Low data storage rate (1-2K/sec). Runs under PC-DOS. We provide device drivers & demo software. DIALOG/1 with voice I/O for \$295, DIALOG/2 with phone interface \$495, DIALOG/3 with 300B modem \$595. Send for data sheets. *Dialogic Corp., 164 McKinley Ave., East Hanover, NJ 07036, 800/221-0393, 201/386-0202*

IEEE-488 Interface

Complete implementation of the IEEE-488 std. On-board firmware supports all data/command transfers & many special features. Our customers include HP, TEK, IBM, & major OEMs worldwide. Uses standard cables. Comprehensive documentation. See *Byte* 2/84, p. 334. \$395. *Capital Equipment Corp., 10 Evergreen Ave., Burlington, MA 01803, 617/273-1818*

Disk Drives

Disk Drives for PC

Qume 142A (½ Ht):	\$209
Teac FD55B (½ Ht):	\$209
TM100-2, DS, 40T:	\$209
TM101-4, DS, 80T:	\$315
CDC 9409 DS, 40T:	\$235

MAYNARD complete internal 10M Winchester hard drive system. From \$959. Visa/MC/COD. *VLM Computer Electronics, 10 Park Pl., Morristown, NJ 07960, 201/267-3268*

Graphics Systems

Angel Workstation

High resolution color graphics workstation, 640 × 480, 16 colors from a palette of 4,096. Business presentation, CAD and 3-D software available. Create graphics interactively with mice and

digitizers & display images using monitors, computer cameras, video projectors, frame grabbers, printers & plotters. *Media Cybernetics Inc., 36 Columbia Ave., Takoma Park, MD 20912, 301/270-0240*

Need a Solution?

We do one thing right... Corporate Graphics! We provide installation, training & support for analytical/presentation graphics, 2-D & 3-D CAD. Authorized dealers for all major hardware & software items for PC graphics. Call for a professional demonstration & consultation. *On-The-Go Computer Company, 1210 St. Georges Ave., Avenel, NJ 07001, 201/636-3232*

Midas Color Card

2 board set that turns IBM family of computers into color graphics workstations. Provides full emulation of IBM color card. Designed for either XT or PC with expansion chassis. Hardware graphics primitives including zoom, pan & scroll. Color palette of 4096. Printer & light pen support. Paint software. *Vectrix Corp., 2606 Branchwood Dr., Greensboro, NC 27408, 919/288-0520*

Multigraph Board

Monochrome & color display adapter compatible with IBM PC. Monochrome graphics (1-2-3 compatible) with 720h x 350v resolution. Expandable options include "Soft Scroll" smooth scrolling, 132-column display, high resolution color graphics in 16 colors, & more. Price base configuration, \$499. *Profit Systems, Inc., 30150 Telegraph Rd., Birmingham, MI 48010, 313/647-5010*

Printers

NEC Spinwriter Catalog

FREE CATALOG! Features the IBM PC compatibles 3550, 2050 and new NLQ PINWRITER. The Ziyad cutsheet feeder for all Spinwriters at \$495. Catalog also illustrates all character sets (with alternate sets) available for the Spinwriter & identifies interchangeable Thimbles. Write or call: *WPPS Inc., One Industrial Way, Eatontown, NJ 07724, 201/389-1600*

PC Color Printer

Canon color printer now compatible with the PC! 16 COLORS, 640 dots/line high resolution, 2600 dots/second printing. GRAPHICS CAPABILITY, and CRT hard copy functions. CUSTOMIZED SOFTWARE and SPECIAL CABLE INCLUDED. *Data Communications and Systems Group, 2240 No. First St., San Jose, CA 95131, 408/943-9770*

RamDisk

RamDisk II

is a 180K RAMDISK & comes with a PRINT SPOOLER. Runs on IBM PC compatible systems, & WORKS EXACTLY LIKE ANOTHER DRIVE. Instantaneous loading of programs. NO hardware, NO commands, 100% software! Self-initializes at bootup. Searches ALL boards for memory. Only \$59.95 for the ramdisk & our print spooler. *Rensin Communications, P.O. Box 414, College Park, MD 20740, 202/728-7955*

Storage Devices

Diskit 10 + 10R Subsystem

Combination 10M fixed Winchester plus 10M. Removable Cartridge for fast disk-to-disk backups. Compatible with MS-DOS backup & restore utilities with variable directory configuration per cartridge. Higher fixed capacities to 150M available. Excellent for XT backup using 10M removable cartridge only. *Systems Peripherals Consultants, 9747 Business Park Ave., San Diego, CA 92131, 619/693-8611*

Leasing

PC•XT•COMPAQ Rental

Don't tie up cash! Attractive rates & flexible terms. Quick delivery anywhere in the U.S. All configurations available. A portion of your payment can apply to purchase. Lease terms of 1 month & up. Customized leases available to fit special budget requirements. Call or write for no-obligation quote. *Computer Maintenance Management Corp., Attn: Leasing Division, 12800 Industrial Park Blvd., Minneapolis, MN 55441, 612/559-7096*

Mailing Lists

IBM PC Mailing Lists

100,000 IBM PC owners mailing list available now! We are the largest dealer of microcomputer owners' names, with over 600,000 total...many different brands. Plus 3700 stores lists, 2,600 computer clubs, educational lists, micro publications, & much more. Write or call for free catalog. *Irv Brechner, Targeted Marketing Inc., Box 453, Livingston, NJ 07039, 201/731-4382*

IBM PC Mailing List

A plethora* of sales leads ... all IBM PC users ... on either cheshire or pressure sensitive labels or magnetic tape. \$90/1000. Also postcard packets.

*plethora: more than 100,000. *Foothill Marketing, P.O. Box 595, Tujunga, CA 91042, 213/352-7543*

Publications

Online Business Info

150 business newsletters online, full-text, including 40 for the computer professional. Every word indexed in current/back issues. Issues online before print editions. Equiv. print value: \$30,000/year. Low-cost service includes NewsFlash, unique electronic clipping service, plus UPI and PR Newswire. *NewsNet, 945 Haverford Rd., Bryn Mawr, PA 19010, 800/345-1301, 215/527-8030*

dBASE II in English I

New Book Sensation. Simple—Logical—Easy to understand. Perhaps the finest computer book ever written. Will teach any novice to program in dBASE II. 242 pages full of great examples. Written by a father and son team who have decoded dBASE. Order your copy today. Dealer inquiry invited. Send \$29.95 or MC/Visa to: *English I Computer Tutorials, 1617 N. Troy St., Dept. B, Chicago, IL 60647, 312/489-1588*

WordStar in English I

Amazing 184 pg. book transforms difficult letter commands into meaningful names. ^G = Good-bye. ^KP = "Kingdom" Print. Makes learning WordStar a breeze. Easy to understand explanations and clear exam-

ples. Includes use of MailMerge and special IBM keys. Dealer inquiry invited. Send \$12.95 or MC/Visa to: *English I Computer Tutorials, 1617 N. Troy St., Dept. B, Chicago, IL 60647, 312/489-1588*

Infosource for the IBM PC

A monthly, loose-leaf publication w/timely info on hardware, software, books & periodicals for IBM PC, XT & PCjr. Provides independent reviews, selective product descriptions, comparative charts, detailed system requirements & complete index. Authoritative, up to date source, including a binder. \$89 (annual) or \$29 (complete, current issue). *Infosource for the IBM PC, P.O. Box 417, Bogota, NJ 07603, 201/836-7389*

Retailers

California

Edge-PC: IBM-Like

PC-88 CPU card	\$399
Color/Graphic card	\$199
Disk adapter with cable	\$169
Multifunc.-64K-1P-1S-C	\$220
Keyboard	\$153
System Enclosure	\$135
65W Power Supply w/fan	\$140
Disk Drive 1/2H/DS/DD	\$179
<i>Edge Micro Systems, Inc., 2350 Walsh Ave., Santa Clara, CA 95051, 408/980-9866. Telex 3719075</i>	

New York

MABS

(MABS) Merchant's Automated Business System. A menu-driven accounting system for IBM & compatible Microcomputers.

Order Entry	199.95
Invoicing	99.95
Accounts Receivable	99.95
Inventory Control	99.95
Sales Analysis	99.95
Mailing	99.95
Bookkeeping	199.95

Dealer inquires welcome. To order: *The International Computer Shop, 218-81 Hempstead Ave., Queens Village, NY 11429, 212/776-5264, 706-0452*

Ohio

Discount Software

Total access to all your micro-ware needs. Personal, educational, business & entertainment software. Hardware & accessories too!

- Attractive Prices
- Toll Free Ordering
- Prompt Shipping
- Free Catalog

Access Micro, 11306 Southland Rd., Forest Park, OH 45240, 800/543-1114. AK, HI, OH, 513/825-5803

Sales/Marketing

Authors!

Convert your programs to cash—We are seeking innovative programs for the small business market. Our design & merchandising team is ready to transform your program into a successful software package & make it sell. We pay up-front sign-on fees & competitive royalties. For details: *Micro Marketing Assoc., 3497 E. Livingston Ave., Ste. A, Columbus, OH 43227, 614/231-4956*

Software

Accounting

Accountants Software

Finally! A software source for the practicing accountant with programs designed especially for the professional practitioner. Depreciation, After-The-Fact Payroll, Form #1099 Generator, Account Analysis & Client Information System are just a few of many. Call or send for our complete catalog. *Omni Software Systems, Inc., 146 N. Broad St., Griffith, IN 46319, 219/924-3522*

Practicing Accountants

Ten of the top 12 CPA firms use AMI Software for Professionals. DATAWRITE™ Client Write-up allows custom reports, packs mainframe power into your micro. Expand your practice with Fixed Asset Management, Post

Facto Payroll, Practice Management & The TAX MACHINE.™ Nationwide training/support. *Accountants Microsystems, Inc., 3633 136th Place SE, Bellevue, WA 98006, 800/426-8201, 206/643-2050*

Agricultural

Feed Blending Programs

MIXIT-2 (\$595) finds least-cost rations for all animals. Hundreds of ingredients & 57 user-chosen nutrients. MIXIT-3 (\$995) runs multiple rations. Each ration is stored on disk and summarized in a one-page output. PRICE-IT (\$395) is a feed pricing and inventory program. Demo disks available. *Agricultural Software Consultants, 1706 Santa Fe, Dept. P, Kingsville, TX 78363, 512/595-1937. Telex 757375*

Assemblers

Cross-Assemblers

Use your desktop computer as a development system with Avocet assemblers—the industry standard since 1980. Available for CP/M-80, CP/M-86, & PC-DOS/MS-DOS host systems, in most popular disk formats. Target chip families: 6805, 6809, 1802/05, 8048, 8051, 6502, 6800, NEC7500, F8, Z8, COP400, 8085, Z80. \$200 to \$500. *Avocet Systems, Inc., 804-W South State St., Dover, DE 19901, 800/448-8500, 302/734-0151*

Automated Data Entry

Bar Code

BEMIX™ software alone re-directs COM1 to the keyboard of an IBM PC for simultaneous input from ANY bar code reader or RS232 device. Use with 1-2-3/VisiCalc/WordStar/etc. Print your own bar code on Epson/C. Itoh/IBM/Okidata printers. Total bar code systems for assets/tape rentals/POS. BEMIX™ \$150, BC PRINT PAK \$350. *Digital Bar-code Systems, 1401 D. North Kraemer Blvd., Anaheim, CA 92806, 714/630-2993, 714/630-8640*

Business Applications

Myte Myke™ Business Pkg

Commercial Grade-Integrated

* Business Acct: O/E P/O A/R
S/A Inventory A/P G/L

* Mfg Ctrl: STD Cost, BOM,
Oper Rtg, FCST-Sched, MRP,
SFC, where used, MPP, Prod.
Costing *JOB SHOP*

* ProTime: Time & billing, in-
stallation + ongoing support
avail. CP/M, PC-DOS, MS-
DOS, UNIX, others.

MDS Associates, P.O. Box 108,
Orchard Park, NY 14127,
716/662-6621

Linear Programming

MINI-MAX (\$395) is saving a
copper refiner in Ashland, IL,
\$10,000 a month. "It's extremely
easy to use," says an investment
counselor in Oakland, CA. See
how linear programming can
boost your profits. The demo
disk (\$30) includes a Beginner's
Guide and 70-page manual with
7 examples from business & in-
dustry. *Agricultural Software
Consultants*, 1706 Santa Fe,
Dept. P, Kingsville, TX 78363,
512/595-1937. Telex 757375

dINVOICER + PLUS

Menu-driven billing & accounts
receivable management system.
Produces Invoices, Aged State-
ments, Invoice Journals, Receipts
Journals, Aged Customer Ac-
count Status, Packing Lists, etc.
Available with modifiable source
code for dBASE II users \$129, or
as a stand-alone RunTime™
package \$199. Visa/MC.
dATAMAR SYSTEMS, 819 Gage
Dr., San Diego, CA 92106,
619/223-0444

The PriceBook

A multi-purpose system that can
be used to generate invoices, pur-
chase orders, quotations or any
other business application that
requires price extensions & totals
calculated. Ideal for sales & in-
surance agents, estimators, sub-
contractors, buyers, billing per-
sonnel, et al. Price \$99.95.
Manual alone, \$15. *RJL Systems*,
106 New Haven Ave., Milford,
CT 06460, 203/878-0376

LP88-Linear Programming

Solves problems with 255 con-
straints & 2255 variables. Fully
menu-driven, spreadsheet-style
display, double-precision ac-
curacy, Revised Simplex method
start/restart options, primal &

dual solutions, sensitivity analy-
sis, report generator, storage of
problems & bases, user's guide &
examples. \$88. *Eastern Software
Products*, 4804 Tarpon Lane, Al-
exandria, VA 22309,
703/360-6942

Lionheart

Business & statistical books/soft-
ware packages. Explanatory
books, professional compiled
programs. EXPERIMENTAL
STATISTICS, \$75. FORECAST-
ING & TIME-SERIES, \$75.
BUSINESS & ECONOMIC
FORECASTING, \$95. BUSI-
NESS & FINANCE MATH,
\$32. Of real use at work and at
home. Free catalog. Visa/MC/
chks. *Lionheart Press Inc.*, P.O.
Box 379, Alburg, VT 05440,
514/933-4918

Better Business Basic

BB/M™. The original Business
Basic Programming Language
from MAI/Basic Four®. It's fast:
lets you stop, make corrections
and then continue the run. It's
convenient: built-in data file sys-
tem. It's flexible: Powerful string
handling. It's compatible: runs
under MS-DOS. Write or call:
MAI/Basic Four Business Prod-
ucts, 601 San Pedro NE, Albu-
querque, NM 87108,
800/321-9916

Business/Home

Public Domain Software

Our Users Group library can help
you get more from your PC or
PCjr! Choose from these soft-
ware packages:

- NEW PC or PCjr USER—
3-disk starter set, \$25.
- PC SIX-PAC—Six disks con-
taining a wide variety of
useful software, \$49.
- SAMPLER DISK—One get-
acquainted disk, \$10.

Send in your order today. In-
clude \$2 s/h. Catalog included.
Central California Users Group,
P.O. Box 8140, Santa Cruz, CA
95061

Tallymaster

Control business & home ex-
penses with a better approach to
spreadsheets. Totals by item &
category; each category named;
built-in sorts; easy to learn &
use; clear documentation. Five
Star rated by 80 Micro. Needs
128K PC, disk. Now only \$99.95.
Order toll-free. Visa/MC/COD/
checks OK. *ProSoft*, 7248 Bell-
aire Ave., No. Hollywood, CA
91605, 800/824-7888, oper. 577,
213/764-3131

TexSolver-10

Turns your PC into a super-
calculator! One-keystroke execu-
tion of over 50 functions, includ-
ing trig, statistics, powers, etc.
Uses a number "stack", the same
as high-quality HP calculators.
Combines the best features of a
calculator & a PC. For ease-of-
use, accuracy, & convenience.
TexSolver-10 is an unbeatable
value. \$39.95. *Microtex*, Box
111054, Carrollton, TX 75011,
214/980-9837

Calculator

The Disk Calculator

A premium desk-top calculator.
Features: 18 digit results; decimal
selector; constant; running totals;
subtotals, item numbering; date
stamping; printing comments; re-
calling results; accumulating a se-
ries of results; chained calcula-
tions; power; percentages; future
& present values; User's Guide.
\$29. *RJL Systems*, 106 New
Haven Ave., Milford, CT 06460,
203/878-0376

Calendars

Calendar Plus

A time management system that
displays activities in block calen-
dar; prints calendar for selected
range of activities, times, person-
nel or locations; prints calendar
extracts in tabular lists; merges
separately maintained calendars.
Much more. PC-DOS/MS-DOS
versions 192K, any printer. \$150.
International Software Solutions,
3355 Lenox Rd. #750, Atlanta,
GA 30326, 404/233-1519

Church Applications

Parish Data System™

Comprehensive church program,
menu-driven, extremely easy to
operate. Family, Member, Finan-
cial info & all reports integrated
into one package. Ability to get
selective listings, mailing labels;
contribution, tuition statements;
personalized letters. User able to
create own reports & letters.
\$950. *Parish Data Systems, Inc.*,
3140 N. 51st Ave., Phoenix, AZ
85031, 602/247-3341

Communications

VT52/100/102 Emulator

PC100 turns your IBM PC (or
compatible PC) into a DEC
VT100/52 terminal. PC102 adds
VT102/printer support and file
transfer to PC100. PC102SV even
supports 132 columns. We guar-
antee compatibility with all
VT52/100 applications including
EDT, KED, WORD11, and vi.
Call or write for free brochure.
From \$89. *General Micro Sys-
tems*, 7525 Mitchell Rd. #101,
Minneapolis, MN 55344,
612/937-9194

Easy to Learn & Use

Ideal for accessing public data
bases, DIRECT.CONNECT was
designed for those with little or
no communications experience.
Manual written as Tutorial with
Quick Reference for veterans.
Help is accessible anywhere in the
program. Xmodem protocol
guarantees accurate data transfer.
\$95. *Direct.aid, Inc.*, P.O. Box
4420, Boulder, CO 80306,
303/442-8080

2780/3780 Emulation

MicroGate & MicroGate II are
integrated hardware/software
products bringing bisync commu-
nications to the PC. MicroGate
provides easy-to-use, stand-alone
2780/3780 emulation. MicroGate
II works with user programs by
providing a callable bisync sub-
system for custom application
software. Qty. 1: \$895. *Gateway
Microsystems Inc.*, 9501 Capital
of Texas Hwy. #105, Austin, TX
78759, 512/345-7791

BLAST Communications

BLAST communications software
links PCs with mainframes,
minis, and other micros. Full du-
plex async, any speed to 19.2
kbps, any modem, via dial-up
phones, 100% error-free. For
IBM (CMS & TSO), Sperry, DEC
VAX & PDP; Data General;
Wang; HP3000; Apple; MS-
DOS; CP/M; CP/M-86; and
UNIX/C for many CPUs.
*Communications Research
Group*, 8939 Jefferson Hwy.,
Baton Rouge, LA 70809,
504/923-0888

Compilers

C Software Development

Full C Compiler per K & R

- Inline 8087 or Assembler Floating Point
- Full 1M Addressing for Code or Data.

MS-DOS 1.10/2.00 Library Support

- Program Chaining Using Exec.
- Environment Available to Main c-window™ C Source Code Debugger.

COMBINED PACKAGE, \$199.
c-systems, P.O. Box 3253, Fullerton, CA 92634, 714/637-5362

Wizard C Compiler

The power of C with the thorough diagnostics of Pascal. Full LINT diagnostics integrated with compiler. Full UNIX System 3 compatibility. Floating point library; fast compact code; 1 register variable. In-line assembly code. UNIX emulation library. Uses Microsoft LINK. PC/MS-DOS 2.00 only \$450. *Wizard Systems Software, Inc., 11 Willow Ct., Arlington, MA 02174, 617/641-2379*

Construction

Bid Ref.

A Bid History Program for the IBM PC. Sorts past bid info by contractor or job. Generates instant data on dates, price ranges, average bids, sq. footage, price per sq. ft., no. of bids & more. An invaluable tool for keeping track of a competitor's and/or subcontractor's pricing. Only \$79. AZ residents add 6% sales tax. *Contractor's Software, 2050 W. Elm St., Phoenix, AZ 85015*

Corporate Skills

Participative Mgmt.

Participative Mgmt. Skills (PMS) stresses leadership & group activity, two behavioral areas that increase the productivity of decision making. It reduces conflicts by generating cooperation, improves interpersonal relationships within groups, & creates an environment for improved personal & organizational satisfaction. *Concourse Corp., 2626 East 82nd St., Minneapolis, MN 55420, 612/854-8848*

Culinary Arts

"Compu-Chef"

A complete Culinary Guide for the IBM PC. Create a personal Recipe Library, Directory of Foods, perform Food Cost & Portion Comparisons. COMPU-CHEF has over 90 Continental Recipes, Culinary terms, a Calorie guide, Herbs & Spices, & more. Home & restaurant use. Req. 128K, DOS, double-sided disk drive. Special intro., \$30. Distributors invited. *DeAmicis Software Development, 4193 Galbar St., Oceanside, CA 92056, 619/758-4766*

Data Management

Instant Recall

Store 10K records, 30 fields. Each record has a history. When a client calls, you have instant recall on what you talked about last. The number of histories & length of each is only limited by disk space. Each contact is automatically dated. Reports, sorting, etc. Perfect for doctors, lawyers, sales people. \$245. *Intelligent Systems Inc., 490 Hickorynut Ave., Oldsmar, FL 33557, 813/785-0378*

GOLDATABase

GOLDATABase is an easy-to-use DBMS for the IBM PC/XT. Data bases & reports are painted on the screen. Selection is by English-like commands. Procedures & a W/P interface are included. A BASIC Programmers Interface is available. With it, programs are written in BASIC that access GOLDATABase. *Goldata Computer Services, Inc., 2 Bryn Mawr Ave., Bryn Mawr, PA 19010, 215/525-1036*

dBASE II Math Pack

Now dBASE II can give you greater accuracy AND faster arithmetic operations. d8087™ links dBASE II to the 8087 math chip. Simple dBASE II calls permit you to access the power of the 8087 for greater speed & 18 sig fig accuracy. \$450 + tax. Call & ask about our other dBASE II utilities. *David Jenkins, Midway Software Inc., 1609 Bancroft Way, CA 94703, 415/644-2369*

Data Security

PROTEC

A sophisticated data security program that protects the hard disk on an IBM PC/XT and COMPAQ. Provides three levels of protection:

(1) Only authorized users can access the hard disk. (2) Users are segregated from each other. (3) Optional encryption allows floppies to be secured. Makes hard disk menu-driven. *Sophco, Inc., P.O. Box 7430, Boulder, CO 80306, 303/444-1542*

Secure Communications

The ENIGMA SYSTEM is an integrated security & communications package (software/hardware-one board) for networking PCs. Features include: Encryption, Access Control, Dial Back, Tamper Detection, Network Management & an on-board MODEM 300/1200 baud, Auto Dial/Answer, Async/Sync SDLC. Price, \$1395. *Isolation Systems Limited, 1631 The Queensway #6, Toronto, Ontario M8Z 5Y4 Canada, 416/259-5401*

Protect Your Data!

VAULT keeps the right information out of the wrong hands. In plain everyday English, each user picks "coding keys" to turn sensitive information into random garbage. Confidential data, documents, or software can be stored, mailed or telecommunicated & remain safe until needed again. List \$285. Req. DOS. No other software/hardware req. *Management Analytic Support Inc., Route 4, Box 4127, La Plata, MD 20646, 202/293-1624*

Development

Active Trace

A debugging & learning tool that lets you see how your BASIC program works. As program runs, Active Trace shows variables & their current value & line number. Output to screen printer or disk. No need to single step. Complete XREF mapping, review in Byte 4/83, p. 334, & *Microcomputing* 12/83, p. 22. \$79.95. For info/ordering: *Awareco, P.O. Box 695, Gualala, CA 95445, 707/884-4019*

Dictionary

cheapware™

WORD LIST: Almost 27,000 words from 3 to 15 letters consisting of all but proper nouns, hyphenated words & words w/ embedded foreign characters. Words are stored in random format supplied on a DSDD disk-

ette. A utility to add, delete or change an entry as well as a display function are included. \$14.95. MO res. add 5% tax. *Robert L. Nicolai, 4038 N. 9th St., St. Louis, MO 63147*

Edit

KEDIT

KEDIT is an XEDIT-like full screen editor for the PC. Split-screen editing of multiple files, targets, ARBCHAR, SCHARGE, GETFILE, SORT, wordwrap, paragraph reformatting, block operations, key redefinition. Requires 80 column display, 160K. \$95 + \$3 shipping. Demo version \$10. *Mansfield Software Group, Box 532, Storrs, CT 06268, 203/429-8402*

Educational

PC/Pilot

Language for education and training. By MicroPi, the source of PILOT on the other major personal computers. Meets Common PILOT standard. Extensions for color, graphics, user fonts, windows, files and video disk/tape control. Includes EZ editor. Lic: \$100 single, \$550 multiple. *Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, 206/734-8248*

Hebrew Scribe

Type Hebrew with your IBM PC or XT. Makes Hebrew school homework more fun. Satisfaction guaranteed or your money back. Makes a great gift! Requires color/graphics adapter. (For optional hard-copy, included screendump requires Epson printer.) Call, ask for Gary Rosen. To order send \$29.95 to *Gamma Productions, 817 10th St. #102, Santa Monica, CA 90403, 213/451-9507*

PC Prompter

IMAGINE A HELP KEY. PC PROMPTER provides help for IBM DOS & BASIC

- Detailed explanations & examples
- Create your own help files
- Runs on IBM PCs

Price, \$49.95. Also available: Help for Personal Editor, \$19.95. Chks/MO/Visa/MC. Coming soon: PASCAL, BASIC Compiler & program dev. system. *Prompter Software Corp., P.O. Box 1242, Los Altos, CA 94022, 415/948-5321*

The Research Assistant

Easy-to-use literature filing system for PC or XT. Stores bibliographic data, user-defined subject/keyword headings & an abstract for every item. Rapid search on any word or phrase in ref or abstract. Sorts, merges & copies library files. Prints book lists & annotations. Reqs. 64K, two 320K dd. \$40, U.S. *Smart Microsystems, #8—13322 102A Ave., Surrey, B.C. V3T 5J7 Canada, 604/585-1629*

Foreign Language Tutor

POLYGLOT software is a must for learning a foreign language. Use it to compile & maintain word lists, quiz yourself & print study lists. Synonyms & accents can be used. System needed is IBM PC, XT or PCjr with drive. POLYGLOT is quality at a low price: \$12.95 (+ CA tax). Order POLYGLOT from: *Alchemy Software, P.O. Box 1057, Aptos, CA 95001, 408/688-6252*

TYPIST—Teach, Test

Modern typing tutor for PCjr, PC and XT. The TYPIST teaches rapid, accurate typing by the touch method. Computer analysis shows overall and individual key performance. Beginner, intermediate, advanced. Individual or class use. User-prepared drills. Many options. \$40 plus \$3 shipping. *Choice Software, P.O. Box 726, Dept. J1, Centerville, UT 84014, 801/292-7424*

Engineering

Structural Design

Quick, versatile, interactive structural programs—beams, columns & frames of any material efficiently analyzed & designed. Extremely friendly input/output with COLOR graphics options. Specify PC configuration and send \$25 for demonstration disk to: *c²b² - software design, 763 27th Ave., San Francisco, CA 94121, 415/751-1337*

Mech./Elec. Design

Programs for HVAC Loads, Building Energy Analysis, Faser Energy Acctng., Duct Sizing, Lighting, Short Circuit, Voltage Drop, Pipe Sizing, Multiple Phased Life Cycle Costing, & more avail. for CP/M, CP/M-86, & MS-DOS computers. All disk formats supported. Demo disks avail. on each program for \$33. Send/call for literature. *Elite Software, P.O. Drawer 1194, Bryan, TX 77806, Bus.: 409/775-1782, By Modem: 409/775-0760*

smARTWORK™

Printed-circuit artwork editor for double-sided boards up to 10" by 16"; runs on an IBM PC. Color display allows complete interactive control over the placement & routing process. 2X artwork can be made on a dot-matrix printer or pen-and-ink plotter. \$895. Write or call for a brochure. *WINTERK Corp., 1801 South St., Lafayette, IN 47904-2993, 317/742-8428*

Hydrology/Hydraulics

Modified TR-20 & WSP adapted from mainframe versions. Hydraulics highlights: model actual sections, bridges, culverts; 15 profiles/run, output for hydrology routing. Hydrology highlights: SCS/user's unit hydrograph, stream or reservoir routing, adds hydrographs, multiple storms. 256K, DOS 1.10. \$75 each, with manual. *Salcedo Engineering Co., 3040 Aurora, El Paso, TX 79930, 915/565-0841*

Financial

The Financial Counselor™

A comprehensive personal financial planning data base program developed by a Certified Public Accountant & Financial Planner. Includes Income, Net Worth & Budget Statements; Investment, Insurance, Tax, Retirement & Estate Planning Worksheets; Personal Accounting Journals; Financial Planning Instruction, Advice, Glossary & Bibliography. *Financial Counseling Programs, Inc., 2049 Century Park E. #3050, Los Angeles, CA 90067, 213/556-2053*

MicroFORESIGHT

Mainframe decision support power for the IBM PC.

- True Business Modeling
- Forecasting/Statistics
- Goal Analysis
- Sensitivity Analysis
- Consolidations
- Communications
- Report Generation
- Financial Routines

All in one easy-to-use English-based language. ISA provides consulting, training & hot-line support. *ISA Information Center, 500 Northridge Rd., Atlanta, GA 30338, 800/554-1193, 404/587-6800*

Money Maestro

A financial record-keeping package that provides budget tracking & tax reporting. MONEY MAESTRO reports totals by category or payee, including monthly & year-to-date budgeted vs. actuals. Data files are stored in BASIC sequential format. MONEY MAESTRO requires 64K, DOS. *Innosys, Inc., 2150 Shattuck Ave. #601, Berkeley, CA 94704, 415/843-8122*

Games

Reno Casino I

Reno rules, vivid color graphics emulate casino action. 21 has variable speed, up to 7 begin. to adv. players, \$2 to \$500 table limit. 3 modes include tutoring & auto-play. Realistic 5-card draw poker machine & bonus random art program incl. 64K, DOS 1.00 or 2.00, 1 dd. Only \$29.95 (CA Res. add 6% tax). *KEN-COMP, 1833 Humboldt Ave., Davis, CA 95616, 916/753-0564*

Blackjack Analysis

Tell the computer exactly how you play. Splits, double, ins., stick. Then let it play 20,000 hands an hr. for you. Automatically varies bet depending on card counting technique you use. Allows interactive play w/help key. Uses 1-6 decks, really shuffles. 1-2 players. After play is completed, one page report is produced w/game stats. \$65. *Intelligent Systems Inc., 490 Hickorynut Ave., Oldsmar, FL 33557, 813/785-0378*

Sfinks PC Chess Game

The number 1, USCF rated 1793, chess game for the TRS-80 is now available for your IBM PC. Featuring problem mode, opening book, takeback, game save, clock, printer, hints, superior color/monochrome graphics, Sfinks PC is unsurpassed! 64K disk, only \$49.95 + \$2 s/h. MC/Visa. FL add 5% tax. *William Fink, 1105 N. Main St., Ste. 24-B, Gainesville, FL 32601, 904/377-4847*

Games/Educational

cheapware™

GRAMARCY—The Word Game. If you like anagrams & play this game in your daily paper, you'll love Gramarcy. Program displays all words of 4-11 letters in any word, or will give a

word, you find all words in it & score the # of correct words. Game totals saved to show improvement. Utility incl. to modify word list. Req. 128K & DS drive. DOS 2.X, \$29.95. DOS 1.10, \$33.95. *Robert Nicolai, 4038 N. 9th St., St. Louis, MO 63147, 314/621-7618*

Genealogy

Family Reunion

For IBM PC, XT, or PCjr. Keeps track of living relatives as well as genealogical data. Address labels, birthday lists, pedigree charts, group sheets & more! Price, \$99.95 (add \$20 for optional BASIC source code). Required, PC-DOS, 128K, PC printer capabilities. Visa/MC/COD/Dealers. Add \$2.50 s/h. *Personal Software Company, P.O. Box 776, Salt Lake City, UT 84110, 801/943-6908*

Graphics

Grafmatic: Fortran/Pascal

4 packs in 1! Other sources have text/graphics; pixels/line/paints but GRAFMATIC follows thru w/2D interactive, 2D plots (contour too!), 3D plots & solid models (hidden line removal for realism). 100 pg. manual makes it easy! BASIC & COBOL versions too. Specify compiler. \$135. Call for a personal response. *Microcompatibles, 11443 Oak Leaf Dr., Silver Spring, MD 20901, 301/593-0683*

PC-Title/PC-Projector

See PC mag's (Dec., pg. 619) review of this useful tool for creating full color professional text for slides, screen displays & fliers. Add complete graphics with PC-crayon. PC, PCjr, XT & COMPAQ compatible. PC-Title/PC-Projector, \$49.95. PC-crayon, \$44.95. Mention this ad & get all 3 for \$79.95. Visa/MC. *PC Resources, Inc., 620 Hobart Terrace, Santa Clara, CA 95051, 408/243-4169*

Halo

The most powerful library of graphics subroutines under MS-DOS. Extensive functions include point, line, pie, arc, circle, ellipse, hatch styles, pattern fills, clipping, dithering, world coordinates, image compression, multiple viewports, rubberband mode, etc. Compatible with multiple devices & languages. *Media Cybernetics, Inc., 36 Columbia Ave., Takoma Park, MD 20912, 301/270-0240*

Plotmatic

Pen Plotter Graphics Tools

- Pen/Text, control/color
- Complete 2-D support
- Interfaces with GRAFMATIC
- Clear & careful documentation
- Languages: FORTRAN, Pascal, COBOL, BASIC.

Specify compiler & plotter: H-P, Apple, IBM, Houston Instruments. \$135. PLOTMATIC by Microcompatibles. *Microcompatibles, 11443 Oak Leaf Dr., Dept. W, Silver Spring, MD 20901, 301/593-0683*

"G" Graphics Editor

Fast, Versatile, Easy to Use. Single key commands. Draw w/cursor: Change speed, pen width. G does lines, shapes, text, more! Create elaborate color patterns. Move, copy, mirror, flip images. Load pictures into own programs. Perfect for Artists, Programmers, Designers, Educators. Runs in 128K. \$95. *Micro Marketing Associates, 3497 E. Livingston Ave., Ste. A, Columbus, OH 43227, 614/231-4956*

CAD Software

It's brilliant, fun to use, cost effective, and increases productivity! Over 100 packages on the market. Want to know more about CAD software? When you call or write us, you will receive expert advice, excellent prices, and most important—Professional Support! *Brighter Images, 1042 Country Club Dr., Moraga, CA 94556, 415/376-6002*

Home Use

dBASE II Programs

LUCINDA's ABC's & 123's do not need graphics card. Rewards child with 26 designs. Profiled by Ashton-Tate in dNEWS. DISKETTE INVENTORY, searches by diskname, filename ext, date. RECORD & TAPE INVEN. searches by name, song, performer. \$24.95 ea + \$3 s/h. Req. IBM PC/XT, 128K, with dBASE II(2.4) or RunTime, \$100. *Feller Associates, 550 CR PPA Rt. 3, Ishpeming, MI 49849, 906/486-6024*

Home/Hobby Inventory

The RDM HOUSEHOLD INVENTORY allows you to organize & maintain a personal property file on diskette, & print sorted reports by location, category, value, description, etc. Great for security, tax, & insurance record-keeping. \$29. Collector versions also available. 64K. *RDM Computer Services Co., P.O. Box 23, Staten Island, NY 10301, 212/273-0663*

Info Retrieval

ICETRACK

Data Control System. Use powerful search, sort & report functions to organize & output data. No need to design screens or define files. Unique menu-driven report maker eliminates the formatting of documents. Includes ICEWORD to create letters & merge-print for use with your ICETRACK files. \$149. *ICE Systems Inc., 345 Queen St. #980, Honolulu, HI 96813, 808/521-3567*

Insurance

The Agency Manager™

Designed by insurance professionals for independent insurance agents, this integrated system performs Complete Customer Acctg., General Ledger, Client Data update & retrieval (# files depends on your storage), Over 100 Marketing Reports & Sales Tools, ACORD's. Easy main menu & HELP feature. IVANS. IBM XT, CP/M, Turbodos. *Applied Systems, Pauling Rd., Monee, IL 60449, 312/534-5575*

Inventory Control

Mr. QuarterMaster

Features: receipts & issues updating; inventory, reorder & usage reports; screen display of stock item(s); price quotes, purchase orders & invoices; reorder points adjusted automatically & file maintenance to add, change & delete stock items. List Price: \$120. Manual alone: \$15. Free brochure. *RJL Systems, 106 New Haven Ave., Milford, CT 06460, 203/878-0376*

Languages

FORTH-32

Use up to one megabyte of memory for programming and data! Complete Development System includes a Symbolic Debugger, Structured Decompiler, Full 8088 Assembler, Editors, Graphics. Our 480 page manual is the best! \$195. Fully compatible software and 8087 Floating Point Extensions. \$95. Call today. *Quest Research, Inc., 303 Williams Ave., Huntsville, AL 35801, 800/558-8088, 205/533-9405*

BI-280/BI-286

BASIC interpreter that runs programs written in BASIC Four Corporation's Business BASIC II, a popular language used extensively at the minicomputer level. Built-in ISAM manager gives fast, keyed access to data files.

Control-C Software, Inc., 6441 SW Canyon Court, Portland, OR 97221, 503/297-7153

BASIC Translator

Program Development Made Simple. \$CALL subprograms from our rich Demo Library or create your own in minutes. Parameter driven, 3-program set provides: Compiler, Interpreter & Printer support

- Logic Mapping
- Variable List
- Meta Comds.
- Code Reduction
- Linker Modules
- \$39, \$59 & \$79

FREE Brochure.

Personal Software Associates, Inc., Drawer 206-PCW, Donegal, PA 15628, 412/423-3200

C86 C Compiler

Our C compiler keeps the best company. Customers who use our C86 C compiler read like a who's who of the software industry. We would like you to join them in using our fast, reliable, UNIX & MS-DOS compatible C compiler. \$395. • Full K & R implementation • Fully supported • MS LINK • LIBRARY SOURCE • Call for further info & reference list. *Computer Innovations, Inc., 980 Shrewsbury Ave. #327DR, Tinton Falls, NJ 07724, 800/922-0169, 201/542-5920*

NGS FORTH

NGS FORTH is a complete program development system. Standard features include: complete MS-DOS support, 79 standard, screen editor, multi-segmented, extended addressing, environment save & load, auto load screen boot, decompiler & debugging aids, 8088 assembler, graphics & sound, & much more. \$70. *Next Generation Systems, P.O. Box 2987, Santa Clara, CA 95055, 408/241-5909*

Legal

LawSearch—Westlaw

Access the WESTLAW legal data base using an IBM PC or compatible. Certified and recommended by West Publishing for their WESTLAW subscribers using PCs. Easy to learn & use:

Log-on automatically w/one keystroke. Save information to disk or printer. Convert files for use with a wordprocessor. \$350. *Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080*

Legal Billing

Complete time billing package for firms with up to 18 lawyers. Features exclusive "video timeslip" for "magic quick" entry. Prints detailed client statements, lawyer time & client aging reports plus more. Large record capacity. Trust accounts & automatic interest. Very friendly. \$399. *Satori Software, 5507 Woodlawn N., Seattle, WA 98103, 206/633-1469*

Manufacturing

Twin Oaks MRP-II

- Bills/Material
- Inv Control
- Purchasing
- MRP & CRP
- Master Sched'g
- Phys Inventory
- Std Costing
- 22 Modules
- 128K PC or XT
- DOS 1.10, 2.00
- Hard/Soft Disk
- Online-Real Time
- Multi User
- Acctg Interface

Twin Oaks, 8130 E. Point Douglas Rd. #109, Cottage Grove, MN 55016, 612/458-1604

Helmsman's H-MRP

Mature & classic on-line, net change, MATERIAL REQUIREMENTS PLANNING. Modular, fast, simple, easy, flexible, and cost effective. Integrates with financial accounting. Runs on PC-DOS 2.00, 256K, hard disk, stand-alone or networked. Includes H-BOMM, H-BUY, H-STORE, H-MAKE, H-PLAN. *Helmsman Systems, Inc., 1030 S. Winchester #205, San Jose, CA 95128, 408/246-8300*

MCBA Software System

Adapted for the IBM PC using MS-DOS. Inventory Management, Bill of Materials, Order Processing, Purchasing, Job Costing, MRP, Labor Performance, Shop Floor Control, Standard Product. Costing & Routing, Accounting. Install. & support available. In use at over 11,000 installations! *MDM Systems, Inc., 5701 Chicago Rd., Ste. C, Warren, MI 48092, 313/979-7030*

Manufacturing Inventory
Designed with the small to medium-sized manufacturing firm in mind, MISys is big enough to handle your needs, yet costs only \$995. Integrated Inventory Control, Bills of Material, Purchase Orders. For IBM PC/XT & compatibles. Multi-user versions also available. Dealer inquiries invited. *Microcomputer Specialists, Inc.*, 18 Lyman St., Westboro, MA 01581, 800/833-1500, 617/366-1200

Medical

Threshold

Medical office management w/ automatic insurance preparation, teleprocessing to Blue Shield and Medicare, unattended statement processing, total security, statistical reports, inquiry management reports & on-line help. FREE REMOTE DEMONSTRATIONS AVAILABLE. List \$5,500. *Physicians Practice Management, Inc.*, 1810 S. Lynhurst Dr., Ste. Q, Indianapolis, IN 46241, (Nat) 800/428-3515, (IN) 800/792-3525

POS/1™ Version 4.0

Medical billing: Produces statements, ins. forms, aging, revenue analysis w/Bar Graphs. Multiple doctors, insurances. Day sheets, recall notices, referring doctors, audit trails. Online update, access by account#/name. Customizable procedure/diag. codes; menu-driven; help screens. DOS 128K. \$2200. *Chen Information Systems, Inc.*, 1499 Bayshore Hwy. #205, Burlingame, CA 94010, 415/692-4358

Health Practices Analysis

Comprehensive health analysis gives users information on their personal health practices, existing health hazards & cancer warning signs. Calculates life expectancy & shows how health practices affect longevity. Personal \$59.50, Professional \$259, Occupational & Life Stress modules. *MedMicro*, Box 9615, Madison, WI 53715, 301/236-0397

Menu System

MenuMaster

Create custom menus for IBM PC & XT applications quickly & easily. You love PC-DOS, but do your users? MenuMaster supports complex job streams, run-time prompts, real-time clock display, hard disk, color, graphics & more. Menu system req. IBM PC,

64K, 1 disk. Menu editor (creates & modifies menus) req. 192K. Full system, \$175. MC/Visa. *DecisionWare*, P.O. Box 505, Moorestown, NJ 08057, 609/778-0799

Music

SongWright

Music Processor prints songs & professional lead sheets complete with lyrics & chord notations. Allows you to compose, save, edit, transpose & play your songs. Features two octave range, simple harmony, seven key signatures. Requires IBM or Epson graphics printer. Send \$24.95 or write for brochure. *SongWright*, 928 Fillmore St., Denver, CO 80206, 303/321-0481

New Ideas

Law of Economic Justice

A totally new concept based on logic & the laws of physics which provides irrefutable solutions to the problems of unemployment, the welfare "mess" and foreign trade. \$100. 30 day full refund if you do not concur, or \$25 + your evaluation but no refund. *Robert S. Vierra*, 2229 Woodside Lane #2, Sacramento, CA 95825, 916/927-6476

Pharmacy

Easy Script System

After 8 yrs. of installing pharmacy computers in the SE, Easy Data Systems offers pharmacy programs using MS-DOS for the PC or compatibles. Rx processing/drug inventory, \$1000. Accts. Rec., \$300. Acct. Payable, \$300. Payroll, \$300. General Ledger, \$300. Durable Medical, \$500. Nursing Home Processing, \$1000. 1 yr. free subscription service. *Easy Data Systems Inc.*, 9320 Pine Ridge Rd., Ooltewah, TN 37363, 615/894-9719

Project Management

ProjectMaster™

Achieve Project Management! Plan, manage & present using Critical Path Method. Easy entries produce Gantt charts, cost & resource reports. "Moving Window" displays give clear visual presentations. Unique project "crashing" feature. Compare ProjectMaster with your requirements today! *Simple Software, Inc.*, 2 Pinewood, Irvine, CA 92714, 714/857-9179

Psychological

Self-Help Therapy

For problems of stress, depressed feelings, relationship problems, even erection problems, the answer is as close as your PC. New interactive programs based on clinically proven therapy and developed by a renowned psychotherapist. Use at your convenience in the privacy of your computer. \$89.95 each. *PSYCOMP™*, 22055 Clarendon St., Woodland Hills, CA 91367, 818/992-4884

Public Domain

Public Domain "Freeware"

Hundreds of games, utilities, & business programs aren't copyrighted, so are in the public domain. Copy them yourself & save! RENTALS: IBM PC SIG—100 Vols., \$99.50. IBM PC BLUE—45 Vols., \$49.95. Rental is for 7 days after receipt, 3 days grace for return. Credit cards accepted. 50 5" floppy disks \$100. *National Public Domain Library*, 1062A Taylor St., Vista, CA 92083, 619/727-1015, 24 Hour Order. 619/941-0925, Customer Service.

Public Domain Software

PUBLIC DOMAIN SOFTWARE for the IBM PC. Programs include financial & stock market analysis, word processing, communications, utilities, games & more. 100 + page Directory—\$3.95 + \$1 s/h. A set of 10 most popular disks is \$59. Set of 100 disks—\$595. (CA residents add sales tax). *PC Software Interest Group*, 1556 Halford Ave. #130W, Santa Clara, CA 95051, 408/247-6303

Real Estate

Property Management +

A new easy-to-use system for single or MultiFamily properties. Print checks, rent statements & receipts reports—late rents, expired leases, vacancies, income/expenses & operating statements. Includes a bank reconciliation feature & graphics capabilities. Up to 70% reduction in management time. \$525. *Realty Software Co.*, 1926 S. Pacific Coast Hwy. #229 Redondo Beach, CA 90277, 213/372-9419

Property Management

Software for owners of apartments, mini-storage, single family, condos, marinas, shopping centers and office complexes. Provides instant cash flow analysis, prints cash flow report, records expenditures on each unit, prints summary of operations report and accumulates cost for tax purposes. Visa/MC. *Tomar Productions*, P.O. Box 740871, Dallas, TX 75374, 214/750-1212

Management & Analysis

"Real Property Management" \$295, for apts., offices... Records & projects income/expenses/budget by month/account/unit. No retyping of recurring monthly data. "Real Analyzer" \$195, is 5 programs in 1 for analysis of Income Property and the Residence. Easy WHAT IF. PC/XT/jr. 30 day money back guarantee. Visa/MC. *Real-Comp Inc.*, P.O. Box 1263, Cupertino, CA 95015, 408/996-1160

Investors/Syndicators

Let your computer calculate the right price. A complete analysis: cash flow, taxes, projections, & syndication feasibility. All values easily changed for risk analysis or structuring an offer. A powerful tool for making sound investments. \$250. Manual & demo disk, \$35. IBM PC & CP/M computers. *DRF, Inc.*, 3333-F Soquel Dr., Soquel, CA 95073, 408/475-4456

EZ-RE Investor Templates

Real Estate Investor Templates. Equity Share, Houses, Apartments, Warehouses, Office Bldgs. 10 year projection of cash flow, deduction, tax at sell, after tax IRR. Expenses, int., rent & apprec. adjustable annually. Mortgage types—ARM, FHA 245, amort, deferred int., int. only. RNMI format. Req. 1-2-3. \$ back guar. \$50 ppd. Visa/MC. *LB Associates*, 8817 Skokie Lane, Vienna, VA 22180, 703/938-9093

Property Managers

Two systems to match your exact property management needs. RENTAL MANAGER handles all tenant activities; features built-in general ledger. Flexibility allows multiple properties per owner. CONDO MANAGER is designed for community associations. Handles member payments, charges, & generates accounting reports. *Coleman Business Systems*, 3654 Arcadian Dr., Castro Valley, CA 94546, 415/581-7125

Religion

Bible Studies Part 1

A series of studies proving how mankind is being deceived by following man's doctrines & not God's. Other subjects: coming of Christ, where are the dead? Pre-existence of Christ & many more. These studies will open your eyes & help you know what God expects from us. Write or call for info. \$34.95. *Ray's Electronics, Box 254, 632 E. 4th St., Nescopeck, PA 18635, 717/759-3894*

Scientific

muMATH-83™

Infinite precision rational arithmetic plus automatic formula manipulation. Includes exact integration, differentiation, limits, matrices, vector calculus, infinite series Laplace transforms & the solution of algebraic or differential equations: \$300. Also muLISP: \$250. *The Soft Warehouse, P.O. Box 11174, Honolulu, HI 96828*

PHYSICALC™

Scientific calculator program with automatic dimensional checking & algebraic units conversion. 140 Metric, British, U.S. units & 19 fundamental constants. User definable units, constants, & functions. 200 Page guide including comprehensive tutorial. \$125. *Micro Ware, 477 Anolani St. #2300, Honolulu, HI 96821, 808/373-9740*

Sort

Opt-Tech Sort/Merge

Extremely fast Sort/Merge program for the IBM PC. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts dBASE II files! Compare before you buy any other. Write or call for more info. \$99. *Opt-Tech Data Processing, P.O. Box 2167, Humble, TX 77347, 713/454-7428*

Stamp Collectors

Stamp Collectors

The Philatelic Management System is superior software for every level of collector. Covers every aspect of collection management. Inventory Module now available & upgradable to complete system. IBM PC, Apple IIe and III.

Complete system \$295, Inventory Module \$159. Demo package \$15, credited to final purchase. *SoftStyle, Inc., 7192 Kalaniana'ole Hwy. #205, Honolulu, HI 96825, 800/396-6368*

Statistics

SIGSTAT

SIGSTAT includes over 30 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for uni- (e.g., ANOVA, regression) and multivariate (e.g., canonical, factor) analyses; time series, crosstab, plots and much more. 8087 support opt. 128K, DOS, \$325. *Significant Statistics, 3336 North Canyon Road, Provo, UT 84604, 801/377-4860*

Statistician's Mace 2.00

A full-featured program. Calculates descriptive stats, multiple regression, correlations, several ANOVAs, nonparametric tests, data transformations & much more. Reads data from keyboard or disks created by word-processors or data base programs. Requires IBM PC/XT, 128K PC/MS-DOS, 1 disk. \$195. Evaluation version, \$30. Buy direct or from dealers. *MATRIX Calculating Engine (MACE), Inc. 2313 Center Ave., Madison, WI 53704, 608/241-4566*

SURVTAB™

An easy-to-use system for tabulating data from survey questionnaires. Does crosstabs, frequencies, banner tables, means. Perfect for market researchers. Allows up to 80 items per questionnaire. File size limited only by capacity of your disk. Includes 43-page manual. \$180. *Statistical Computing Consultants, 10037 Chestnut Wood Lane, Burke, VA 22015, 703/250-9513*

Stock Market

Stock Portfolio Reporter

Provides up-to-the minute information on key parts of investor's stock account. Market price updates by DOW JONES; easy link to Hayes Smartmodem. Sort by P/E, gain/loss, yield or any item in SPR's 8 useful reports. Friendly menu displays & manual. Re-

quires 128K, 2 dd. Demo disk avail. \$279. Visa/MC welcome. *Micro Investment Systems, Inc., P.O. Box 8599, Atlanta, GA 30306, 404/892-3194*

The Stock Manager

A sophisticated system that offers you an easy & economical way to keep your investment portfolio current. Keeps over 25 items of information on over 400 stocks. Produces several reports including current value of the portfolio. Easy to follow menu. \$150. Send or call for our complete catalog. *Omni Software Systems, Inc., 146 North Broad St., Griffith, IN 46319, 219/924-3522*

\$TKWARE™

Plots High, Low, Close, Exp. Mov. average, On-Bal-Vol. Stores up to 600 days. More daily data (cursor controlled) at top of screen. Manual data entry with Error Fixers. Handles splits. Up to 20 stks/disk. *Unprotected*. Requires: BASICA; color graphics; 80 col. mon. Intro. price \$70. Or, write for more info. *\$TKWARE™, W. H. Jack, RFD Box 619W, Marlborough, NH 03455*

Systems

Multiuser PC-DOS

MultiLink turns PC-DOS into an efficient multi-user multi-tasking operating system. Additional users are supported by attaching inexpensive CRT terminals or modems to serial ports on the PC, and can run normal applications designed for PC-DOS. Includes host communications software for public dial-in. *Software Link, Inc., 6700 23-B Roswell Rd., Atlanta, GA 30328, 404/255-1254*

Tax

1040PLAN™

1983 tax planning & preparation software template for 1-2-3. Other calc spreadsheets are too small & slow to run. Follows IRS forms by line number & includes: form 1040 & schedules A, B, C, D, E, G, W, SE & forms 2119, 2441, 3468, 6251. Up to four different alternatives can be computed at once. Req. 256K. \$45. *1040PLAN, 1125 Sunnyhills Rd., Dept. PCW, Oakland, CA 94610, 800/227-1617, ext. 644. In CA 800/772-3545, ext 644*

Templates

1-2-3 Templates

Unique Application Templates Teaches Lotus Usage Thru Practical Applications
1. 1984 Fed Tax Calculator
2. Personal Acct. System
3. Personal Mailing System
\$29.95 ea. 2 or more On One Disk \$25 ea. Visa/MC. 30 Day Money Back Guarantee. *Easy-As ... Inc., 36 S. Charles St. #402, Baltimore, MD 21201, 301/539-5540*

Terminal Emulation

Multi-Terminal Emulator

Flexible communications: Ideal for those with broad or highly specific communications needs. Emulates VT52/100, ADM3A, IBM 3101, Televideo, Hazeltine, & more. Or customize your own emulation using the program's copyrighted communications "language". Virtually unlimited asynch. capability. \$195. *Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080*

Tools

Pascal and C TOOLS

TOOLS includes full string use, screen handling, graphics, and a general BIOS gate. TOOLS 2 supports all DOS 2.00 functions, including program chaining. VIEW MANAGER screens are painted and then stored in a screen data base. Source code is provided. TOOLS \$125, TOOLS 2 \$100, VIEW MANAGER \$275. Visa/MC. *Blaise Computing Inc., 2034 Blake St., Berkeley, CA 94704, 415/540-5441*

PAL

Programming Alternative Language is the easiest & quickest way to develop structured BASIC programs for the PC. Great features: no fielding of data for data files; a b + tree filing system, no sorting required; the optimum screen design for data entry & report screens; and procedures with parameter passing! Only \$200! *K.R. Waletzki, P.O. Box 992, Rosemead, CA 91770, 213/285-3077*

PolyMake

PolyMake, the Intelligent Program Builder & Maintenance Tool for MS-DOS, automatically rebuilds a software system when a module is changed. Using modifiable internal rules, PolyMake invokes your compiler, assembler, linker, librarian and more to update all dependent files. \$99 Prevents bugs & tedium. *Polytron Corp., P.O. Box 787, Del. Sta. 2-305, Hillsboro, OR 97123, 800/547-4000, Dept. 305*

Try Before You Buy

Refundable \$15 Demo package. FTX. Full scr editor. \$65. For program devel & doc. Add, Copy, Del, Ins, Move, Dupl, Stack, Print, Locate, Chg. Copy/Move btwn fls. GENU. Multi-fnc. disk utl. \$45. Menu-driven, Sorted dirs. Dspy, srch, alter sectors. Chg Vol, Hide, Un-hide, Recover, Print, Erase, Rename files. *Probit, Inc., P.O. Box 127, New Lenox, IL 60451-0127, 815/485-3493*

Training

ATI Training Software

American Training International (ATI), a leader in computer based training programs carries a complete line of software designed to get you up & running on your computer & applications software in no time. Training pkgs. for 1-2-3, *Multiplan*, *WordStar*, & popular hardware such as IBM & Macintosh. See display ad this issue. *ATI, 12638 Beatrice St., Los Angeles, CA 90066, 213/823-1129*

InfoStar Tutorials

Two interactive tutorials on *DataStar* & *ReportStar*. All principle procedures are explained including the use of key fields, resorting data files, & using logical expressions. Each tutorial includes a two-disk training program & 50 pg. handbook with exercises & sample applications. \$59.95 each. *Witech Corp., 763 Vallejo Way, Sacramento, CA 95818, 916/441-7772*

Transportation

TSA88-Transportation

Solves problems with 256 origins & 256 destinations. Fully menu-driven, spreadsheet style display, Transportation Simplex Algorithm start/restart options, primal & dual solutions, sensitivity analyses, report generator, storage of problems & solutions, user's guide & examples. \$88. *Eastern Software Products, 4804 Tarpon Lane, Alexandria, VA 22309, 703/360-6942*

Utilities

Peeks 'n Pokes for the PC

A customer told us "Peeks 'n Pokes is the best bargain in *PC World*." We think you'll agree! Discover how to access and modify the status of the PC. Perform DOS and BIOS function calls from BASIC or Pascal. Learn how to find more Peeks 'n Pokes and much more. Disk (58 programs) and manual \$30 + \$2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860*

PC Disk ID

Eliminate the need under PC-DOS 2.00 to reformat disks in order to add, change or delete volume labels. Prints sorted list of files (including hidden files) from disk directory to labels or to a listing. Also allows recovery of files erased inadvertently. Requires PC-DOS 2.00. \$30. NJ add 6%. MC/Visa. *ErgoSoft, P.O. Box 454, Oakhurst, NJ 07755, 201/493-8352*

PC File Compare

Compares the contents of two files and displays the differences in record format. Displayed data may optionally be changed. Compares files of different lengths. No limitation as to the number of non-matching characters. Requires DOS 1.10 or higher. \$50. Visa/MC. NJ residents add 6%. *ErgoSoft, P.O. Box 454, Oakhurst, NJ 07755, 201/493-8352*

DOS 2.00 & 2.10 Users

DOSshell—enhances DOS. Features: Creates a user-friendly "shell" surrounding your system/ Automates commands/ Organizes programs & data by menus/ Online help at all levels/ Utilizes function keys. Includes: disk ar-

chive, data search & more. Extensive manual makes sense of DOS. For hard disk systems. Disk & manual: \$70. *XTC Software, P.O. Box 902, Santa Barbara, CA 93102, 805/967-7837*

The Inside Track

Another bargain! Give your programs speed and control. Read files as fast as DOS, display data faster, load programs faster, control memory use, run any program from your program, copy-protect your disks and much more. Fold-out memory map too! Disk (61 programs) and manual \$45 + \$2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860*

EZdBASE

Easiest yet most sophisticated screen program & file generator ever to support dBASE II on the PC. Simply type screen as you want it to appear w/up to 64 fields-256 characters. Highlight, underscore & reverse video. EZdBASE creates dBASE II program files in sec. \$95 + \$5 s/h. Mention *PC World*, save 10%. Satisfaction gtd. *Automated Office Systems, 4160 Club Dr., Atlanta, GA 30319, 404/237-9420*

Disk Mechanic

The ULTIMATE Floppy Disk Backup & Repair Utility. Can back up ALL software protected disks written on the IBM PC. Works manually or automatically. Files or sectors can be restored, searched, examined & changed. Checks disk drive speed. Requires IBM PC, DOS 1.10(128K)/2.00(192K), + 64K if only 1 floppy drive. \$73 Ppd. USA. For info/MC/Visa: *MLI Microsystems, P.O. Box 825, Dept. PCWD, Framingham, MA 01701, 617/926-2055*

Scrolling Memory

Tired of losing lines that scroll off the top of the screen? Now you can scroll them back down into view! ScrollMate adds up to 14 screens of scrolling memory to DOS. ScrollMate works with DOS (not BASIC) commands & programs that write sequentially to the screen. \$69.95. Free brochure. *Inner Loop Software, 5456 McConnell Ave. #120, Los Angeles, CA 90066, 213/822-2800*

PC Padlock

Unique encryption scheme protects EXE-COM programs from running after unauthorized duplication. Copy programs such as COPYPC will not copy after running this easy-to-use program on your products disk. Protect your software investment & valuable marketplace. Works with all DOS versions. Ask about our DATA PADLOCK. \$99. Visa/MC. *Glenco Engineering, 3920 Ridge Ave., Arlington Heights, IL 60004, 312/392-2492*

hfTOOLS

For BASIC Users. Access the full power of your PC from your BASIC program. A simple call lets you print, scroll or clear the screen, create graphics, display a clock, improve file access, data management & much more. All 22 functions need only 4K, PC or MS-DOS. Comprehensive manual & diskette only \$100. MC/Visa. *H-F Computing Services Inc., 224 Old Orchard Grove, Toronto, Ontario M5M 2E5 Canada, 800/268-1121*

Diskette Manager

A diskette library program for the IBM PC with unique diskette label printing. Labels include: diskette name, file names, comments & storage status. A catalog file is constructed containing up to 6,000 file & comment entries from 200 diskettes. Four reports can be printed from the catalog. \$59.95! *Lassen Software Inc., 468 Manzanita Ave. #5, Chico, CA 95926, 916/891-6957*

Omni Intelligent Disk

NOW, a flexible disk that warns you of impending failures BEFORE they happen! Patented data protection sensors warn of EXCESS HEAT & HUMIDITY. Disks certified at 65% CLIPPING LEVELS. The HIGHEST in the industry. #1N5121 SS/DD-box/10, \$39.90 #1N5221 DS/DD-box/10, \$49.90 \$2 s/h. MC/Visa/MO/COD (+ \$1.85), Check. *Magnetics, Inc., P.O. Box 98, So. Grafton, MA 01560, 800/334-DISK, 617/839-4404*

The Secret WORD

Tap the potential of Microsoft WORD! This step-by-step guide tells you what the manual doesn't & goes beyond to describe many applications for WORD's features, such as windows, style sheets, glossary & merge. Writ-

ten by users with special emphasis on trouble-shooting. Order "The Secret WORD" now for \$14.95. *TechnoLit Center, 1001 Connecticut Ave. NW #628, Washington, DC 20036, 202/293-0909*

Where's the File?

A long time ago in a far away Directory, a file was created. Now try to find it! DR, FND and XTREE will search any or all sub-directories for single or multiple file specs. FND also adds wildcard specs to the FIND program. XTREE provides a complete disk map. All three utilities & manual for \$39.95. *Digital Strategies, Inc., P.O. Box 273427, Boca Raton, FL 33427, 305/487-2699*

● Print Magic-\$39.95 ●

Your IBM/Epson printer does it all! Lay out pages any way imaginable: sideways, as a booklet, pamphlet. Set margins, char. set, style, size (to 35 char. per inch!). Preview on screen. Create & edit char. sets (20 included!). Complete online help, easy menus & more. DOS, 128K. Chk/MO. (PA + 6%). *Digital Concepts, P.O. Box 8345, Pittsburgh, PA 15218*

DOS Data Path Command

Now your programs can access data files under DOS 2.00+ no matter where on your hard disk they are located. DPATH is a system-resident program that effectively extends the functionality of your DOS PATH command to include data files. Includes: interactive screen-oriented maintenance utility, & 60-page user manual. Req. PC-DOS 2.00. \$25. *Personal Business Solutions, Inc., P.O. Drawer 757, Frederick, MD 21701*

TXED Text Editor

Easy to use, powerful full-screen editor for beginning/advanced users. FAST. Edits 2 files concurrently (size is media bound). Cut/paste within & between files. Search (forward/backward), replace, hex conversion, directory, macros, & more. For IBM PCjr/PC/XT. Minimum 64K RAM, 1 disk. \$89. *Progress Management Group, 10791 Tierrasanta Blvd. #104, San Diego, CA 92124, 619/268-4210*

Veterinary

VetLogic™

Developed in collaboration with small & large animal Veterinarians. A/R, billing, Report Generator, word processing, inventory, practice analysis, deposit slips, owner or animal labels. Transfer/restore patient to/from floppy disks. XT. \$3600. Training included. Dealer inquiries invited. *Data Strategies, Inc., 332 S. Juniper St. #210, Escondido, CA 92025, 619/489-9218*

Word Processing

Fontastic™

If you want to SHOUT on paper, here is THE ANSWER! A word processing text customizer. Print your text in many provided font styles or easily create your own! Add special emphasis like italics, bold and underlined, and much more. Requires IBM PC, DOS, 128K, WP or Editor, and dot matrix printer. \$125. *IHS Systems, 4718 Meridian Ave. #211, San Jose, CA 95118, 408/265-5503*

Pelada-Science-Foreign

TEXT ENGINEER and LINGUIST are word processors with special symbols & character fonts. You can design characters, even whole alphabets. Italics, European characters, super/subscripts, math, chemistry & more. Text is displayed EXACTLY as printed. Instant, simple editing operations. \$150 to \$400. *Pelada Informatica Inc., 562 Johnson St., Kingston, Ontario K7L 2A1 Canada, 613/549-1747, Source STP892*

PC-Write™

Features: wordwrap, search/replace, justify, block move/copy/delete, headers/footers, etc. Help screen, quick ref card, 100 page manual. Split screen edits two files at once. Disk w/software & manual \$10; registration w/support, source, commissions \$75. Visa/MC. Shareware: copy and share with others. *Quicksoft, 219 First N. #224, Seattle, WA 98109, 206/282-0452*

cheapware™

SuperScribe: Write a 7 page letter or any length manuscript, create & update a mailorder file & type form letters, duplicate the function of a standard typewriter & emulate the BASIC program editor at a throw-away price. Program supplied on diskette in unprotected BASIC so it may be modified to suit your needs. \$27.50. Specify DOS. MO Residents add \$1.55 tax. *Robert Nicolai, 4038 N. 9th St., St. Louis, MO 63147*

Tape/Disk Conv.

Conversion Services

Mag tape to disk conversion. Any 9 track 1600 BPI MAGNETIC TAPE converted to:
8": CP/M IBM 3740
DISPLAY WR. CPT 8000
IBM SYS/?? IBM PC
5¼": ZENITH
APPLE II TELEVIDEO
MORROW ALTOS
KAYPRO SUPERBRAIN
XEROX DEC VT180
TRS80 Many Others
Disk to disk & disk to tape conversion also avail. *Pivar Computing Services, Inc., 47 W. Dundee Rd., Wheeling, IL 60090, 312/459-6010*

9 Track Tape to Disks

Conversion from ASCII or EBCDIC 1600 BPI magnetic tape (up to 16K blocks) to most 5¼" single, dual or quad diskettes. High speed automated process verifies transfer. Quality guaranteed. Only FIVE CENTS per thousand characters plus \$3 per diskette. \$50 minimum. *Austin Scientific Inc., 1259 El Camino #260, Menlo Park, CA 94025, 415/323-6338*

PC World Directory is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.

FORMAT: The standard format includes a product ID, a 300-character descriptive ad, and the company name, address, and telephone number.

Advertisers may choose among categories already being used or may create their own. Display advertisers can cross-reference their current ad to the PC World Directory for increased exposure at low cost.

RATES: Listings are accepted for 3-time consecutive insertions at a rate of \$420 (\$140 per issue). We are now offering a six-time insertion, 15% discount contract for a total of \$714 (\$119 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.

DEADLINE: For space reservation deadlines, contact a PC World Directory sales representative at 415/861-3861. Please send copy and prepayment to: PC World Directory, 555 De Haro Street, San Francisco, CA 94107.

two
years ago
Nandi
started his
widget
manufacturing
business.

He bought
IBM PC's.

Nandi was
smart.



two
years ago
Dick
started **His**
widget
manufacturing
business.

Dick bought
IBM PC's.

with
UNIVATION
Add-ons . .



Dick was brilliant.

We're UNIVATION . . .

America's fastest growing manufacturer of IBM PC compatible expansion products. Like the PC TURBOCHARGER, which can increase the speed of your IBM computer over 300%! Or the dual 5.5MB Removable Winchester disk! And, many more innovations designed to increase productivity and performance while saving time and money.

Other available products:

- 10MB Internal and External Version
- 20MB Internal and External Version
- Multi-Function Memory Board
- Networking
- Single 5.5MB Removable Winchester Disk

IBM is a trademark of International Business Machines.



(408) 745-0180 Telex: 171627

1037 North Fair Oaks Avenue, Sunnyvale, CA 94089

Circle 261 on reader service card

Reader Inquiry Service

Would you like further information on a product that's advertised in PC World?

Well, it's easy and best of all—FREE!

Just follow these simple instructions:

- Print or type your name and address on the attached card. One card per person, please.
- Circle the number(s) on the card corresponding to the Reader Service number in either the Advertiser Index or Product Index.
- Drop the card in a mailbox and wait to receive the literature that will be mailed to you free of charge from the manufacturer.

The address on the attached card is for product information only. Send editorial comments or inquiries to: PC World, 555 De Haro St., San Francisco, CA 94107.

Name

Company

Address

City State Zip (Zip code needed to insure delivery)

Valid through 9/29/84

☐ Please bill me \$24 for a 1-year (14-issue) subscription to PC World (U.S. and Canada only).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525
526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625
626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675
676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725
726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750
751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775
776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875
876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925
926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950
951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975
976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

11/9

Name

Company

Address

City State Zip (Zip code needed to insure delivery)

Valid through 9/29/84

☐ Please bill me \$24 for a 1-year (14-issue) subscription to PC World (U.S. and Canada only).

I am interested in receiving information about:

☐ Computers

Hardware:

- ☐ Boards
- ☐ Storage Devices
- ☐ Monitors
- ☐ Printers, Plotters, and Typewriter Interfaces
- ☐ Communications
- ☐ Misc.

Applications Software:

- ☐ General Business
- ☐ Financial & Spreadsheets
- ☐ Job and Industry Specific
- ☐ Data Management
- ☒ Word Processing/Text Editing
- ☐ Communications
- ☐ Graphics

System Software:

- ☐ Operating Systems
- ☐ Utilities
- ☐ Languages

Educational, Personal, Entertainment & Misc. Software:

- ☐ Educational
- ☐ Personal
- ☐ Entertainment
- ☐ Misc.

General:

- ☐ Accessories
- ☐ Services
- ☐ Books, Catalogs, and Periodicals
- ☐ Events
- ☐ Mail Order

PC WORLD

Reader Inquiry Service



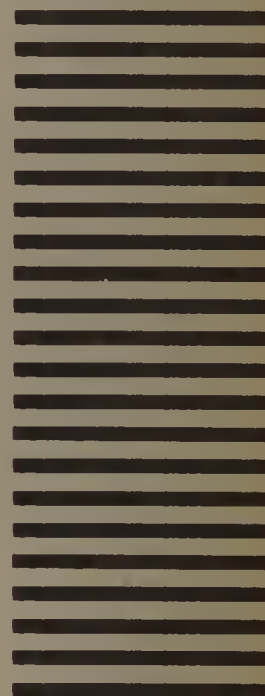
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA.

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
P.O. Box 13897
Philadelphia, PA 19101



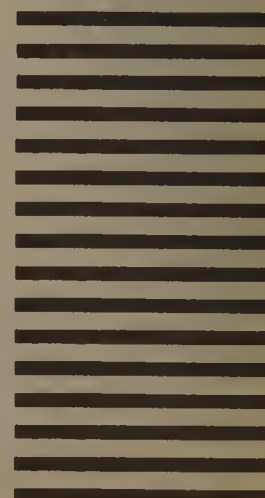
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA.

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
P.O. Box 13897
Philadelphia, PA 19101



YOUR PC IS NOT THE ONLY ONE GETTING THE BYTE (IF YOU'RE NOT BUYING FROM US).

PRICE STOCK SERVICE SUPPORT

We want to help you save money. It's that easy. We don't believe in high prices and fat margins. That's why we're dedicated to give you **the best prices** in the market on **in-stock** items. That means we ship immediately from one of the largest on-line inventories anywhere or we'll tell you we can't. We believe that a deal is no deal without **follow-up service after the sale**. That's why if something does go wrong, we'll fix it fast and free for ninety days. **Expert support** is crucial, both before and after the sale. Whether it's a question of basic compatibility, or a tricky installation, the answer is as close as your phone. **CALL US FOR PRICES.**

Floppy Disk Drives:

TANDON TM100-2 (IBM's 1st choice) \$199
HEY XT OWNERS!!! Add a B drive with our **HALF HEIGHT special!!!** Two half height drives, cable, brackets, 1 year warranty all for just \$349
 Individual **HALF HEIGHTS** each \$179

Printers:

EPSON FX-80 (160cps, 10") \$499
EPSON FX-100 (160cps, 15") \$699
EPSON RX-80T (100cps, 10") \$279
EPSON RX-100 (100cps, 15") \$499
OKIDATA ML92 (160cps, 10") \$469
OKIDATA ML93 (160cps, 15") \$729
OKIDATA ML84 (200cps, 15") \$979
OKIDATA PACEMARK 2410 (350cps, 15") \$2399
DIABLO P38 (400cps, 15") \$1799
GEMINI 10X (120cps, 10") \$279
GEMINI 15X (120cps, 15") \$429
TOSHIBA P1340 (LO dot matrix, 10") \$799
TOSHIBA P1351 (LO dot matrix, 15") \$1499
TI-855 (LO dot matrix w/ font cart) \$799
EPSON LO-1500 (LO dot matrix) CALL
DIABLO 630API (40cps LO) \$1749
DIABLO 630ECS (192 chars on wheel) \$2099
NEC 2050 (durable, low cost LO) \$979
NEC 3550 (33cps LO) \$1749
NEC 7730 (55cps LO) \$1999
C. ITOH STARWRITER (40cps LO) \$1099
C. ITOH PRINTMASTER (55cps LO) \$1499
OUME SPRINT 1140 (40cps LO) \$1399
OUME SPRINT 1155 (55cps LO) \$1599
BROTHER HR-25 (20cps LO, 15") \$699
DYNAX DX-15 (17cps, LO, 10") \$499

Hard Disk Drives:

SYSGEN 10MB HARD DISK (w/ streamer) \$2599
SYSGEN 20MB HARD DISK (w/ streamer) \$2999
SYSGEN IMAGE (back-up for XT) \$ 849
TECMAR 10 + 5, 15 + 5, 33 + 5MB exp chassis) from \$2699
DAVONG 10, 15, 21, 35MB from \$1595
PEACHTREE PERIPHERALS 10MB internal hard disk \$1099

Multifunction Boards:

AST 6-PAK (64-384K, S.P.C C, opt G) from \$279
AST MEGA + (64-512K, S.C C, opt S.P.G.) from \$269
AST I D PLUS (S.C C, opt S.P.G.) from \$129
QUADBOARD I (64-256K, S.P.C C) from \$279
QUADBOARD 384K (64K-384K, S.P.G. C C) from \$289
TECMAR CAPTAIN (64-384K, S.P.C C) from \$269
BABY BLUE II (64-256K, Z80B.2S, P.C C) from \$499
 all of these boards include utility software
MAYNARD CONTROLLER CARDS from \$189

Display Cards:

TECMAR GRAPHICS MASTER (640x400 + mono) \$499
STB GRAPHIX PLUS (mono, color, par) \$399
PRDFIT MULTIGRAPH (mono, color, opt par) \$399
QUAD COLD R I and II (color, hi/res opt) ea \$219
AMDEK MAI (mono, color, par, w/ HALO) \$399
PARADISE (mono, color, par) \$429
HERCULES (hi/res mono, runs LOTUS) \$359

Monitors:

AMDEK COLOR IV (720x480 bright colors) \$549
AMDEK COLOR II + (color monitor) \$399
AMDEK 300 A and G (Amber or Green) \$149/\$139
AMDEK 310A (Amber, 1/2 IBM's price) \$179
PGS SR-12 (690x480 non-interlaced) \$699
PGS HX-12 (690x480 interlaced) \$479
PGS MAX-12 (720x350 mono) \$189

Modems:

HAYES 300 baud external \$209
HAYES 1200 (300 or 1200 baud ext) \$489
HAYES 1200B (300 or 1200 baud int w/soft) \$419
RIXON and U.S. ROBDTICS CALL

Chips:

64K RAM CHIP MEMORY UPGRADE (set of 9) 200ns; full 90 day warranty \$49

Networks:

ORCHID PC NET PLUS STARTER KIT \$1149
ORCHID PC NET PLUS NDDE CARDS \$549
ORCHID PC TURBD CALL
3-COM ETHERSERIES (the original ethernet) CALL

Miscellaneous:

INTEL 8087 COPROCESSOR (high speed math) \$199
ISOBAR SURGE PROTECTORS (4 & 8 plug) \$59/\$79
KEYTRONIC 5151 KEYBOARD (sep. cursor keys) \$209
MOUSE SYSTEMS (optical mouse, runs LOTUS) \$199
POWER BACK-UP (200 & 425 watts) \$269/\$499
MICRDFAZER (8-128K print buffer) from \$139

Software:

MULTIMATE (emulates WANG dedicated WP) \$299
MICROSOFT WORD (w or w/o mouse) \$299/\$229
WORDSTAR PRO-PAK (new version) \$369
PFS Write, Report, File and Grapheach \$99
dBASE II (from Ashton Tate) \$389
KNOWLEDGEMAN (version 1.06) \$299*
RBASE 4000 & 6000 from \$329+
POWER BASE (relational, hierachical) \$399+
CIP (new and fantastic!) CALL+
DAYFLOW (new type of database) CALL+
 *New dBASE alternatives

LATTICE C COMPILER (version 2.0) \$299
DIGITAL RESEARCH (all products) CALL
MICRDSOFT (all products) CALL
DOW JONES (all products) CALL
IUS A/R, A/P, G/L \$299
FINANCIER II \$119
DECISION RESOURCES CHART MASTER \$259
BPS BUSINESS GRAPHICS \$259
Z-SOFT PC PAINTBRUSH w/FRIEZE GRAPHICS \$99
PROKEY VERSION 3.0 \$99
SET-FX for your EPSON \$45
NORTON UTILITIES \$59
CDPY II PC by CENTRAL POINT \$35
COMPUERVE STARTER KIT \$35
SEAWAYS by FUNK SDFTWARE \$49
HAYES SMART COM II \$109
CROSSTALK XVI by MICROSTUFF \$109
RELAY communications package \$99

IBM PC's for less:

IBM PC w/64K, 2 360K drives, controller \$2149

IBM PC w/256K, 2 360K drives, controller, AST 6-PAK, HERCULES GRAPHICS monochrome adapter, AMDEK 310A monochrome monitor and BROTHER HR-25 LO printer w/cable \$3699

IBM PC w/256K, 2 360K half height drives, 10MB PEACHTREE PERIPHERALS internal hard disk, controller, AST 6-PAK, TECMAR GRAPHICS MASTER hi/res color and mono adapter, AMDEK COLOR IV hi/res color monitor, EPSON FX-100 w/cable \$5399

(These systems are brand new, shipped fully tested and burned in, fully warranted for 90 days AND ARE ALWAYS IN STOCK!)

PROGRESSIVE MICRO DISTRIBUTORS

"IBM PC System Enhancement Is Our Business
 ...Personal Service Is Our Commitment."

FOR ORDERS ONLY

1-800-446-7995

for further information and technical support

1-404-446-7995

7000 Peachtree Industrial Blvd.
 Norcross, Georgia 30071

All prices are subject to change.
 IBM is a registered trademark of International Business Machines

Circle 274 on reader service card

Just Announced

The wide world of PC products

Edited by J. Schaffner

In the fast-paced personal computer marketplace *Just Announced* keeps you apprised of the latest developments in IBM PC and compatible technology. Information for this department is provided by manufacturers; these write-ups are not reviews. Many of these descriptions will be followed up by reviews in future issues.

Hardware

Boards

Diamond Trackstar

An expansion board that lets an IBM PC run programs written for CP/M and Apple operating systems. Diamond Trackstar has a Z80A microprocessor for CP/M applications, a 6502B microprocessor for Apple programs, and a separate 6502B display controller to improve the resolution of the Apple screen output. The board supports monochrome, RGB, and composite monitors. Display size is 24 lines with 40 or 80 columns. Graphics resolution is 280 by 192 pixels with 16 colors. The board has 64K that can operate as a disk emulator. List price: \$695. Diamond Computer Systems Inc., 3380 Montgomery St., Santa Clara, CA 95050, 408/986-0100.

Modems

Companion

An external full-duplex modem that communicates at up to 1200 bps and comes with *Mite* communications software. It requires a serial port, 64K, and one disk drive. Features include automatic answering with speed detection, automatic redialing, tone and pulse dialing, and diagnos-



Companion, CTS

tics. Two telephone jacks provide both voice and data communication. The Companion operates asynchronously at 300 and 1200 bps and synchronously at 1200 bps. List price: \$495. CTS Corporation, 400 Reimann Ave., Sandwich, IL 60548, 815/786-8411.



SX/1200, Microcom

SX/1200

An external 1200 bps modem that communicates with computers and information services that support the Microcom Networking Protocol (MNP). It requires a serial port. The modem's MNP firmware allows data stream transfers, error detection and correction, and retransmission of lost data. The SX/1200 has automatic dialing and answering and stores up to nine telephone numbers. A rack-mount version is available. List price: \$599, rack-mount version \$579. Microcom, Inc., 1400A Providence Hwy., Norwood, MA 02062, 617/762-9310.

Tel-A-Modem

A modem combined with a desk telephone that has two lines for simultaneous voice and data communications. It requires a serial port. The full-duplex modem communicates at 300 and 1200 bps with automatic answering and speed detection. The



Tel-A-Modem, Code-A-Phone

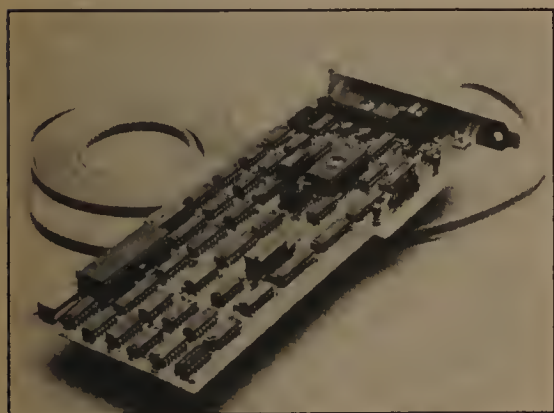
commands are the same as those for Hayes modems, so the modem is compatible with most communications software. LEDs on the telephone's faceplate indicate the modem's status. Telephone features

include automatic dialing and redialing, volume controls, and hold functions for both lines. List price: \$695.95. Code-A-Phone Corporation, 16261 S.E. 130th Ave., Clackamas, OR 97015, 503/655-8940.

Network Devices

AST-PCnet II

A distributed-bus, twisted-pair network for IBM PCs, XTs, and PCjr's that does not require dedicated print



AST-PCnet II, AST Research

and file servers. It requires 128K and one disk drive. AST-PCnet II links up to 32 PCs on a 500-foot cable; optional controller boards with repeater circuitry support four additional 500-foot, 32-node network sections. The network uses a Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA) access protocol, provides file and record locking, and operates remote printers and disk drives with DOS commands. All software that runs on PCnet will run on AST-PCnet II. List price: for two PCs \$1290. AST Research Inc., 2121 Alton Ave., Irvine, CA 92714, 714/863-1333.

Starlink

Network hardware and software for connecting up to four terminals or microcomputers to an IBM PC. It requires 512K and two disk drives. The Starlink expansion board has its own 8088 microprocessor, 64K, and four serial ports for connecting the terminals. The board comes with a version of Concurrent PC-DOS that allows the computers to share files, data, and software. The operating system lets programs swap and update data, lets single or multiple terminals perform multiple tasks simultaneously, and lets the main console use multiple windows. Starlink comes with software drivers that let non-IBM terminals and microcomputers run software such as *WordStar*, *MBA Accounting*, *SuperCalc2*, *dBASE II*, *Multiplan*, and *Milestone Project Manager*. List price: \$1695. Digital Research, 160 Central Ave., Pacific Grove, CA 93950, 408/649-3896.

Printers

RX-100

A 9- by 9-dot printer that offers 136 columns for spreadsheets, ledgers,



RX-100, Epson America

and other wide documents. It requires a serial or parallel port. The RX-100 prints at 100 characters per second and has a half-speed quiet mode. Features include 128 type styles, international character sets,

and dot-addressable graphics modes ranging from 60 to 240 dots per inch. The printer weighs 19 pounds and measures 23.3 by 15.5 by 5.2 inches. An IEEE-488 interface is available. List price: \$699, serial port with 2K buffer \$102. Epson America, Inc., 3415 Kashiwa St., Torrance, CA 90505, 800/421-5426, 213/539-9140.

Electronic Compact 2

A daisy wheel printer that doubles as a typewriter. It requires a parallel port. The Electronic Compact 2 prints 14 characters per second and has a switch for selecting operation as a printer. Typewriter features include a keyboard with a computer



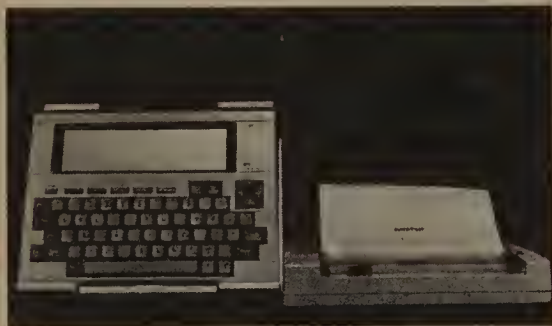
Electronic Compact 2, Olympia USA

layout, access to all characters and symbols on the daisy wheel, three pitch selections, and a correction buffer of 40 characters. The machine measures 18 1/4 by 5 1/2 by 15 inches and weighs 20 pounds. An optional serial port has a 2K buffer with a key for repeat printout of the buffer. List price: \$599, serial port \$149. Olympia USA Inc., Box 22, Somerville, NJ 08876-0022, 201/722-7000.

Just Announced

DataPort

A letter quality daisy wheel printer that is the size of a notebook and weighs 5 pounds. It requires a parallel port. DataPort prints 80 charac-



DataPort, DataPort Computer Products

ters per line at 15 characters per second. The Elite 12 font has 96 characters, including computer characters. DataPort uses replaceable ink units. List price: \$295, ink units \$3.50. DataPort Computer Products Research Facility, 5525 Olinda Rd., Bldg. A, El Sobrante, CA 94803, 415/223-3658.

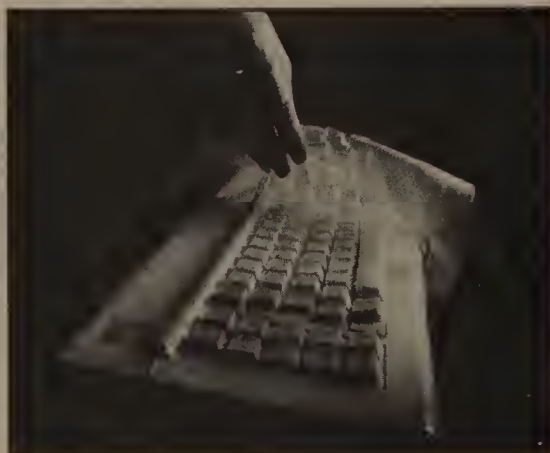
Miscellaneous

Keyboard Extender

An extension cable that adds 5 feet to the length of the cord between the keyboard and the computer to allow more keyboard movement. The Keyboard Extender plugs into the existing sockets. List price: \$19.95. Bytes and Pieces, 550 N. 68th St., Wauwatosa, WI 53213, 414/257-3562.

SafeSkin

A molded keyboard cover designed to remain in place during keyboard use. SafeSkin protects the keyboard from liquid spills, dust, cigarette ashes, smoke, and other foreign matter. The cover is molded from an antistatic polymer and has tactile home row and numeric character locators. Keytops and side markings



SafeSkin, Merritt Computer Products

are visible through the cover. List price: \$29.95. Merritt Computer Products, Inc., 2925 LBJ Frwy. #180, Dallas, TX 75234, 214/942-1142.

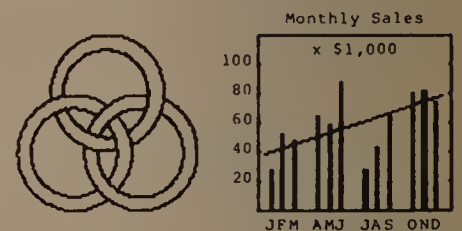
System Software

Languages

GL/M

A graphics language that generates precision graphics on daisy wheel and dot matrix printers. It requires 64K and one disk drive. GL/M (Graphics Language for Microcomputers) draws detailed figures; it is not a "screen dump" program. A picture may contain text, and when printed on a daisy wheel printer, the text has fully formed characters. GL/M supports Spinwriter, Diablo,

SAMPLE DRAWINGS
SAMPLE DRAWINGS
SAMPLE DRAWINGS



GL/M, Aspect

and compatible daisy wheel printers, and Epson, Anadex, and Prowriter dot matrix printers. List price: \$195. Aspect, 167 Worcester Rd., Wellesley, MA 02181, 617/431-7576.

ES/P

A third-generation program editor that simplifies the writing, debugging, modification, and maintenance of Pascal and C programs. It requires 192K, one disk drive, and the appropriate compiler. ES/P (Entry System for Programs) combines text-editing features with automatic syntax checking, automatic formatting, and automatic creation of program structures. You can enter text as usual, view the appropriate language structure at any point, or build an entire structure with one keystroke. ES/P warns of an unbalanced pair of quotes, parentheses, or brackets. Versions for UNIX and ADA are also available. List price: Pascal \$249, C \$349, Pascal and C \$399. Bellesoft, Inc., 2820 Northup Way #150, Bellevue, WA 98004, 206/828-7282.

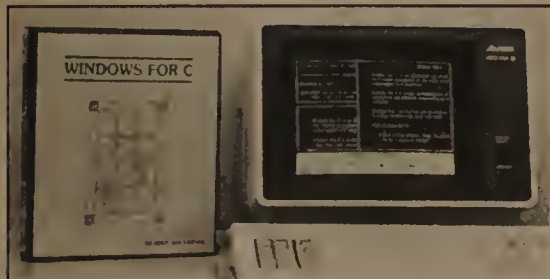
Utilities

Workload

A conversion program that translates ASCII files for use with programs such as 1-2-3, VisiCalc, and SuperCalc. It requires 128K and one disk drive. *Workload* automatically converts any ASCII report file into output formats such as WKS, DIF, SDI, and CSV. It loads each column of numbers and each column heading into columns of the spreadsheet. When you don't want to use the entire report, you can guide the program by selecting and rearranging particular items, or you can pick sections of the report and have *Workload* convert them automatically. List price: \$125. Management Science Associates, Inc., Shadyside Centre, 5100 Centre Ave., Pittsburgh, PA 15232, 412/683-9533.

Windows for C

A program and a library of sub-routines that allow the screen to be divided into any number of windows. It requires 128K, two disk drives, and a C compiler (C86, Lattice C, Microsoft C, DeSmet C, or Aztec C). Library functions let you control the attributes of each window indepen-

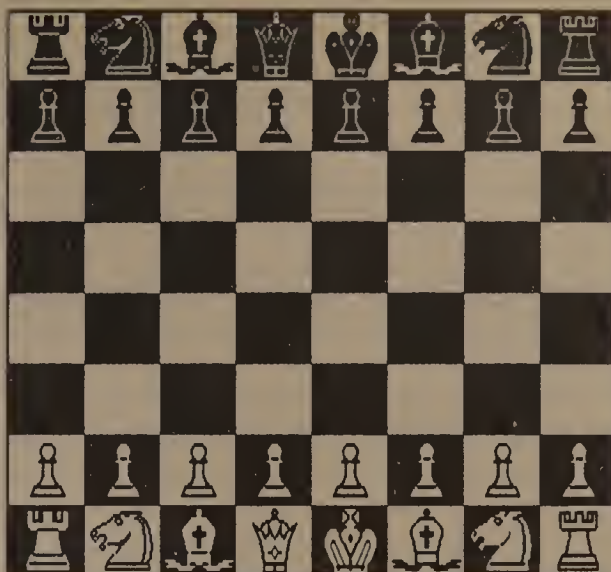


Windows for C, Creative Solutions

BLUEBUSHTM

chess

For the IBM PC and PC-XT



An elegantly designed game that's a challenge at any level of play, from novice through expert. It will play itself, display play lists, check moves for legality and give you help whenever you want it—even select the best move for you.

You can play black or white, set up and start from any board position, make en passant pawn captures, take back unwanted moves. And you can change display color, sides, board setup or play level (7 skill levels, plus postal chess) any time you want during a game.

In graphics mode the chessboard fills the screen with attractive U.S. Chess Federation standard pieces. On IBM Monochrome monitors, the full-screen display offers easily distinguished colors and pieces. The program automatically determines which monitor is available, and gives a choice if you have both.

Cursor piece movement, superb graphics, sound, and simple menu prompts make it easy for anyone to be playing within minutes, and a continuing pleasure for even the most experienced players.

\$49.95. Sturdy plastic diskette storage box, included, makes an easel when it's opened; 16-page Bluebush Chess documentation booklet fits neatly inside. 64K memory and one disk drive, either single or double-sided required. Contact your local dealer or order directly (please add \$2.00 postage and handling; Calif. residents add 6.5% sales tax) from Bluebush Incorporated, P.O. Box 3585, Santa Clara, CA 95055. Telephone toll-free, 800-241-1994; in California, 800-241-1989. Credit card orders welcome.



Bluebush Chess is a trademark of Bluebush Incorporated.
IBM is a trademark of International Business Machines Corp.

CopyWrite backs up all IBM PC Software.

There are no exceptions. Copy-protected software is copied readily. **CopyWrite** needs no complicated parameters.

Requirements: IBM Personal Computer or XT, or Columbia, or Corona.
64k bytes of memory.
one diskette drive.
CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly, to keep up with the latest in copy protection. You may get a new edition at any time for a \$12 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

CopyWrite is available at a price of \$50 US funds from:

Quaid Software Limited

620 Jarvis Street, Suite 2412
Toronto, Ontario, Canada M4Y 2R8
Telephone (416) 961-8243

Circle 673 on reader service card

Introducing:

WINDOW PANES

Unleash the potential of your computer to design and organize colorful video window images.

☐ EDUCATORS!

Create original interactive tutorials on any subject. Use color and music to help make learning fun. Why depend on limited, canned software when you can design your own?

☐ PROFESSIONALS!

Produce compelling sales presentations and computer slide shows. Replace your note pads or index cards with windows of information linked together in ways that make sense to you!

☐ PROGRAMMERS!

Provide on-line help windows and keep a library of video screens. Train new users with dynamic video demonstrations. Interfaces easily with any MS DOS or IBM DOS language.

Use your imagination! No programming is required — let the friendly menus and on-line help screens guide you

Window Panes consists of 3 programs integrated into a revolutionary video organizing tool:

The Window Panes **EDITOR** designs colorful video window images. You "program" each image to present others in response to different user inputs.

The Window Panes **WALKER** interprets the response to one window and displays the next based on criteria you determined in the Editor.

The Window Panes **COPIER** takes "snapshots" of the video output from your favorite programs and makes them available to the Editor.

Window Panes runs on the IBM PC, PCjr or compatible in monochrome or color.

Window Panes \$160 Demo diskette \$20 Video Screen Editor \$40

SOFTright

P.O. Box # 132 / Beaverton, OR 97075 / (503) 641-4072

Circle 174 on reader service card

Just Announced

dently, overlay and restore screens, change attributes of text, and save window contents. Subroutines provide rapid screen changes without flicker or snow. *Windows for C* includes C source modules for viewing ASCII files in multiple windows, menu display and selection, cursor control, and text-mode bar graphs. List price: \$150. Creative Solutions, 21 Elm Ave., Richford, VT 05476, 802/848-7738.

Applications Software

Accounting and Inventory

Dow Jones Software Accounting Series

An integrated family of accounting programs for small businesses. Each program requires 128K and a hard disk drive. The general ledger module has a flexible chart of accounts that does not restrict the type of chart used. Both the accounts payable and the accounts receivable programs can sort by up to 37 criteria and select an account that is the closest match to the information provided. All programs in the *Dow Jones Software Accounting Series* feature menus, text editors, prompts, error checking, numeric entry options, and an automatic audit trail. "What if" calculations let you create preliminary entries and statements without permanently altering the data. The series is integrated, so that information from accounts receivable or accounts payable is recorded in the general ledger. Inventory, management analysis, sales order entry, and purchase order entry modules will be available in 1985. List price: each module \$1000. Dow Jones Software, P.O. Box 300, Princeton, NJ 08540, 800/257-5114.

Business Management

GPSS/PC

A version of GPSS (*General Purpose Simulation System*) that predicts the effects of managerial or engineering decisions on complex, real-world systems. It requires 256K and one disk drive. GPSS/PC has on-line help, programmable function keys, keystroke error prevention, and partial command recognition. The program offers unlimited parameters per transaction, random number generators, and precision statistics accumulators. Interactive features include the ability to interrupt any action, simulate systems manually, access state variables and simulation primitives, and plot values as the program runs. An optional security device lets you run GPSS/PC without the master disk. List price: \$900, security device \$100. Minuteman Software, P.O. Box 171, Stow, MA 01775-0171, 800/343-0664 ext. 4800, in Massachusetts 800/322-1238 ext. 4800.

Communications

The Impersonator

A terminal emulation program that can govern any asynchronous communications, such as access to public data bases, file transfers, and electronic mail. It requires 192K, one disk drive, and a modem. *The Impersonator* offers emulation of seven common terminals and includes a programming language for creating other emulation programs. Five protocols are built into the program, including Xmodem and XON/XOFF. Using the macro command language,

Beyond Board-Driven Networks

Multi-User PC Networks . . . they've always made sense. At least, in theory. The catch is that, previously, every workstation required its own PC . . . PLUS a kilobuck "Network Interface Board." In other words, your cost-per-user was over \$3,000. And that doesn't make sense. Not any more.

Four Workstations for the Price of One . . . with a Software-Driven Network. MultiLink™ is a unique networking system which doesn't require network interface boards. Instead, it transforms ONE IBM PC/XT® (or PC-Compatible) into the CPU of a multi-tasking, multi-user network which utilizes up to eight inexpensive terminals as workstations. Four of these terminals cost less than one PC.

MultiLink™ runs under all releases of PC-DOS™ (except 1.0) and certain implementations of MS-DOS®. A wide range of leading programs which include WordStar®, Lotus 1-2-3™, Peachtext 5000™, and dBASE II® are fully supported.

A Resource-Sharing System. Multiple users are able to access all of your computer's resources, locally, or from remote locations using a terminal with a modem. Features include disk, file, and program-sharing; a dial-in bulletin board, and a comprehensive print spooler.

Make the MultiLink™ Connection Today. Call The Software Link TODAY, and get the whole story. MultiLink™ is immediately available for \$295 and comes with a money-back guarantee. VISA, MC, and AMEX accepted.

MultiLink™



THE SOFTWARE LINK, INC.

6700 23-B Roswell Rd., Atlanta, GA 30328 Telex: 4996147 SWLINK

CALL: 404/255-1254

Dealer Inquiries Invited



MultiLink™ is a trademark of The Software Link, Inc. Terminals courtesy of QUME Corporation.

Circle 526 on reader service card

WCCI DISCOUNT WCCI

BUSINESS & EDUCATIONAL SOFTWARE & HARDWARE

FOR APPLE® & IBM PC®

CATERING TO THE EXPERIENCED COMPUTER USER. Your computer experience means lower prices — you don't pay for support you don't need. PRICES SLASHED!!

APPLE II & Iie PRODUCTS

BUSINESS/FINANCIAL SOFTWARE

	LIST	COST
Ashton Tate dBASE II	695	439
Ashton Tate FRIDAY	295	224
Eagle MONEY DECISIONS VOL. 1	199	144
Applied Software VERSAFORM	389	272
LJK Enterprises DATA PERFECT	130	91
BPI Systems GENERAL ACCOUNTING	395	288
Continental CPA GENERAL LEDGER	250	174
Muse SUPER TEXT HOME OFFICE	125	86
Muse SUPER TEXT PROFESSIONAL	175	122
Sensible SENSIBLE SPELLER	125	87
Sorcim SUPER CALC 2 (Z-80)	295	208
Artsci MAGICALC	150	98
Stoneware DB MASTER V.4	350	254
Dow Jones MARKET ANALYZER	349	261
Dow Jones MARKET MANAGER	299	224
Dow Jones MARKET MICROSCOPE	699	524
Continental HOME ACCOUNTANT	75	53
Continental PROPERTY MANAGEMENT	495	349
Aardvark PERSONAL TAX PLANNER	99	72
Datamost PROPERTY MANAGER	295	211
Microsoft MULTIPLAN	195	139
Monogram DOLLARS SENSE	100	72

*** SUPER INTRODUCTORY SPECIAL ...

STC BASIC RECIPES	250	134
-------------------	-----	-----

WORDPROCESSING SOFTWARE

Soft/Sys EXECUTIVE SECRETARY	250	188
Artsci MAGIC WINDOW II	149	98
Silicon Valley WORD HANDLER	60	44
Broderbund BANK STREET WRITER	70	51
Kensington FORMAT II	150	109
LJK LETTER PERFECT	150	109
Sierra On-line HOMEWORD	70	51

EDUCATIONAL SOFTWARE

Terrapin TERRAPIN LOGO	99 95	69
Versa MEET THE PRESIDENTS	40	29
Xerox STICKY BEAR ABC	40	29
Zeitgeist SPACE MOUSE	50	36
Harcourt Brace COMPUTER SAT	90	64
Milton Bradley PERCENTS	50	35
Scholastic MICROZINE	40	29
Addison-Wesley MATH ACTIVITY	75	54
Avant Grade PAL READING MASTER	100	69
Avant Grade PAL READING 1-6 EA	100	69

100's MORE EDUCATIONAL PROGRAMS IN STOCK FOR IBM AND APPLE. CALL FOR PRICING.

UTILITIES/ACCESSORIES/HARDWARE

MD-1 SS/SD DISKETTES (BOX 10)	40	17
USI ASCII EXPRESS PROFESSIONAL	130	97
SDS ROUTINE MACHINE	65	49
Einstein EINSTEIN COMPILER	129	97
Epson EPSON FX-80 PRINTER	695	529
Distar THINLINE DISK DRIVE	395	189
Koala KOALA PAD	125	89
Coex 16k RAMCARD	99	54

SPECIAL GRAPHICS CARD BETTER THAN GRAPPLER		
Our Own DR. JOHNS GRAPHICS RX	149	99

IF YOU DON'T SEE IT HERE, CALL.

OVER 2,000 ITEMS IN STOCK AT LOW PRICES FOR IMMEDIATE SHIPMENT.

MOST ORDERS ARE SHIPPED WITHIN 48 HOURS. WE WILL NOT CHARGE YOUR CREDIT CARD UNTIL YOUR ORDER IS READY TO SHIP. YOUR SATISFACTION IS OUR ONLY OBJECTIVE!

ORDER PHONE (206) 481-2600

(\$2.50 PHONE CREDIT AVAILABLE)

P.O.'s from Schools & Major Corporations accepted.

TERMS: Mail order only. Minimum order \$100.00. All sales final. Prices shown are for prepaid orders and are subject to change without notice. P.O.'s slightly higher. We cannot guarantee product compatibilities. We will credit \$2.50 for your phone call against your order. All merchandise is new w/MFR's warranties.

PAYMENT: Mastercard & Visa: No extra charge. American Express: add 3% of total order. Cashiers Ck./MO-bank transfers. WA residents add 7.8%.

SHIPPING/HANDLING: Add 2% UPS-surface (min. \$5). Add 4% UPS-air (min. \$10). Postal, Foreign, Special handling add \$10 plus postage and shipping. Hardware extra — call for shipping costs.

TECHNICAL SERVICES

Need programming assistance, consulting, product information? Let the professionals help you. Specializing in dBASE II. Call (206) 485-1707, 9-11 PST.

WCCI 13452 NE 175th, P.O. Box 1028, Woodinville, WA 98072

(MAIL ORDERS ONLY)

NOW IN OUR 4TH YEAR

Just Announced

you can design special logon sequences and transfers to be executed with one keystroke. *The Impersonator* handles differences in terminal keyboards and has character filters for swapping text between programs. Features include automatic dialing, unattended file transfers, error detection, and teletype and typewriter modes. List price: \$195. Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080.

Data Management

Aladin

A relational data base manager that has integrated modules for entering data, reporting, querying, performing calculations, working with statistics, and interacting with word processing packages. It requires 128K for DOS 1.10, 192K for DOS 2.00, and two disk drives. *Aladin* automatically sorts and indexes records when they are entered. The menu-driven program accommodates records of variable length and allows up to 2 million records per data base, up to 32 files and 512 fields per data base, up to 16MB per file, and up to 192 key fields. A modified B-tree structure speeds searches, including wild-card searches. Passwords and IDs can be assigned at device, function key, file, module, and field levels. *Aladin* can exchange files with programs such as *WordStar*, *VisiCalc*, *1-2-3*, and *dBASE II*. It works with both the MS-DOS and p-System operating systems. A set of Pascal routines, called *Genie*,

lets programmers build specific applications for an *Aladin* data base. List price: \$795, *Genie* \$500. Advanced Data Institute Inc., 1215 Howe Ave., Sacramento, CA 95825, 916/925-2229.

Educational

Language Lab

A language training system that teaches all skills necessary for fluency in a foreign language. It requires 64K, one disk drive, and an audio cassette player. In addition to syntax, usage, and vocabulary, *Language Lab* supplies performance reviews as listings and progress charts. The package includes pronunciation lessons on tape; an interactive audio cassette adapter starts and stops the tape player in conjunction with the lessons. The basic package covers three semesters of classwork, and optional additions let the student add advanced levels to the basic program or customize the lessons. *Language Lab* offers lessons in Spanish, French, Italian, and German. List price: \$235, each advanced level \$69. LampLighter Software, Inc., 7 Breton Ave., Melville, NY 11747, 516/421-2653.

Entertainment

Vegas Craps

A game that lets up to three players bet on a roll of the dice. It requires 64K and one disk drive. *Vegas Craps* includes all bets except "don't," including "pass," "come," number bets, and the "sucker bets." Players can take odds on the "pass" line and on the numbers; appropriate odds are

paid for each roll. *Vegas Craps* stakes each player with \$500 and tracks winnings and losses. List price: \$29.95. Pro Systems, 6561 Gillis Dr., San Jose, CA 95120, 408/997-1776.

Graphics

G

A color graphics editor that uses the cursor as a pen and includes single-key commands for shapes such as circles, ellipses, arcs, and boxes. It requires 128K, a color graphics board, and one disk drive. With *G* you can erase, reposition, copy, mirror, or flip any image. The program includes functions that fill areas with color, control the cursor's speed and the line size, and change palettes and background colors. For experimenting with effects an Undo command reverses the last change made on the screen. *G* pictures can be incorporated into advanced BASIC programs and into programs in any other language if you have the *Halo* library for that language. List price: \$95. Micro Marketing Associates, 3497 E. Livingston Ave., Ste. A, Columbus, OH 43227, 614/231-4956.

Integrated Applications

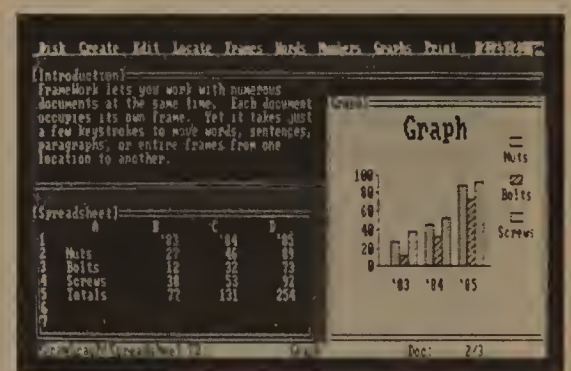
IOAS-3

A data base manager with integrated spreadsheet and word processing functions. It requires 128K and one disk drive. *IOAS-3 (Integrated Office Automation System)* has sort and merge facilities, security, and an interactive report writer. You can have

up to 32,000 records per data base and 512 bytes per record, and you can sort on up to ten fields simultaneously. Spreadsheet features include colors, sorts, searches, and bar charts. You can move totals of items and records from the data base directly into the spreadsheet. The word processor is a full-screen editor with word wrap, file merging, and on-line help. The program comes on five disks for the IBM PC and on two disks for the PCjr. List price: \$199. Micro Architect Inc., 6 Great Pine Ave., Burlington, MA 01803, 617/273-5658.

Framework

An integrated program that combines word processing, spreadsheet, business graphics, data management, and



Framework, Ashton-Tate

outline generation functions. It requires 256K and two disk drives. *Framework* includes a high-level programming language called Fred that can be used to alter any of the pro-

Just Announced

gram's functions and to construct specific applications. Windowlike "frames" can include any combination of numbers, text, and graphs. DOS windows let you run other software within the program. *Frame-work* can use *dBASE II*, 1-2-3, and ASCII files. List price: \$695. Ashton-Tate, 10150 W. Jefferson Blvd., Culver City, CA 90230, 213/204-5570.

Job and Industry Specific

Credimax

A data base manager and accounting system for small credit unions with up to 2000 members and under \$2 million in assets. It requires an IBM PC XT, or the equivalent, with 128K. *Credimax* manages credit union accounts, including shares, certificates, IRAs, Christmas clubs, and loans. The relational data base offers multiple-key access and several levels of data protection and recovery in case of power failure. Automatic payroll deductions can be posted at any interval, split between accounts, and applied as automatic transfers. *Credimax* updates balances and totals and leaves an audit trail for general ledger accounts. The program can verify transaction totals prior to posting and automatically generate dividends that include withholding in special cases. Report capabilities include statements, credit union status, delinquent loans, 1099 and 1099R forms, amortization schedules, dividend registers, audit trails, and mailing labels. List price: \$5995. Syntropy, Inc., 250 West Fork Rd., C.R. 142, P.O. Box 2215, Durango, CO 81301, 303/247-3416.

Spreadsheets

Freecalc

A spreadsheet program with simple formulas that can be selected with a cursor for use in the spreadsheet. It requires 128K for DOS 1.10, 192K for DOS 2.00 and 2.10, and one disk drive. For beginners *Freecalc* provides three sample spreadsheets and a tutorial. Features for experienced users include an area for formula entry and the ability to handle unlimited expressions with as many nested parentheses as necessary. The spreadsheet has 100 rows and 25 columns. Suggested contribution: \$35; you can send a blank formatted disk and a postage-paid return mailer to receive a free copy. Stilwell Software Products, 16403 N. 43rd Dr., Glendale, AZ 85306.

Word Processing

IBM Displaywriter Series

A family of word processing programs that combine menu-driven functions of the Displaywriter system with commands and prompts for the PC, the XT, the PCjr, the Portable PC, and the 3270. *DisplayWrite 1*, which provides basic word processing for the home or office, requires 128K and one disk drive. *DisplayWrite 2*, which supports multiple-page documents and statistical tables

for use by professionals and administrative assistants, requires 192K and two disk drives. *DisplayWrite Legal Support* adds a legal dictionary to *DisplayWrite 2*. A cable and special software, the IBM Displaywriter/Personal Computer Attach Convenience Kit, connect the Displaywriter with your PC or Cluster, letting you transfer documents and files, share a hard disk, and exchange messages. List price: *DisplayWrite 1* \$95, *DisplayWrite 2* \$299, *DisplayWrite Legal Support* \$165, Displaywriter/Personal Computer Attach Convenience Kit \$495. IBM Direct, NDD, 1 Culver Rd., Dayton, NJ 08810, 800/426-2468.

Miscellaneous

Collector's Data Service

An on-line data base for collectors and connoisseurs that provides an international forum for buyers and sellers of rare items. The service has over 20 categories, including antiques, art, classic cars, yachts, and exotic real estate. To enter the system you dial your local Tymnet number, and the system verifies your credit card. A buyer can either leave a message or contact the seller directly. Collector's Data Service also lists stolen property, newsletters, events, auctions, and shows. Connect charges: 14 cents per minute and up. Ad rates: \$3 per month for ten-line ad. Collector's Data Service, Ltd., 420 W. Mercer, Seattle, WA 98119, 206/281-7273.

Publications

Directory of Public Domain (and User-Supported) Software for the IBM Personal Computer

A directory put out by the PC Software Interest Group that lists hundreds of public domain and user-supported programs available for the IBM PC and compatibles at little or no cost. Categories include word processing, communications, DOS and BASIC utilities, games, and spreadsheet templates. The book lists what programs are available and where to get them. PC Software Interest Group also supplies the programs themselves on disk. List price: \$4.95, introductory set of 10 disks \$59, complete set of 135 disks \$814. PC Software Interest Group (PC-SIG), 1556 Halford Ave. # 130S, Santa Clara, CA 95051, 408/730-9291.

Just Announced uses information provided by manufacturers. It does not evaluate products or corroborate manufacturers' claims. Send a description and a photograph of your new product to Just Announced, PC World, 555 De Haro St., San Francisco, CA 94107. ●

IF POWER FAILS, DATASaver® TAKES OVER!

PROTECTION - saves data during power failures.
- saves hardware from overvoltage transients.

PORTABILITY - allows mobile or extended holdup time using auxiliary 12 volt battery.

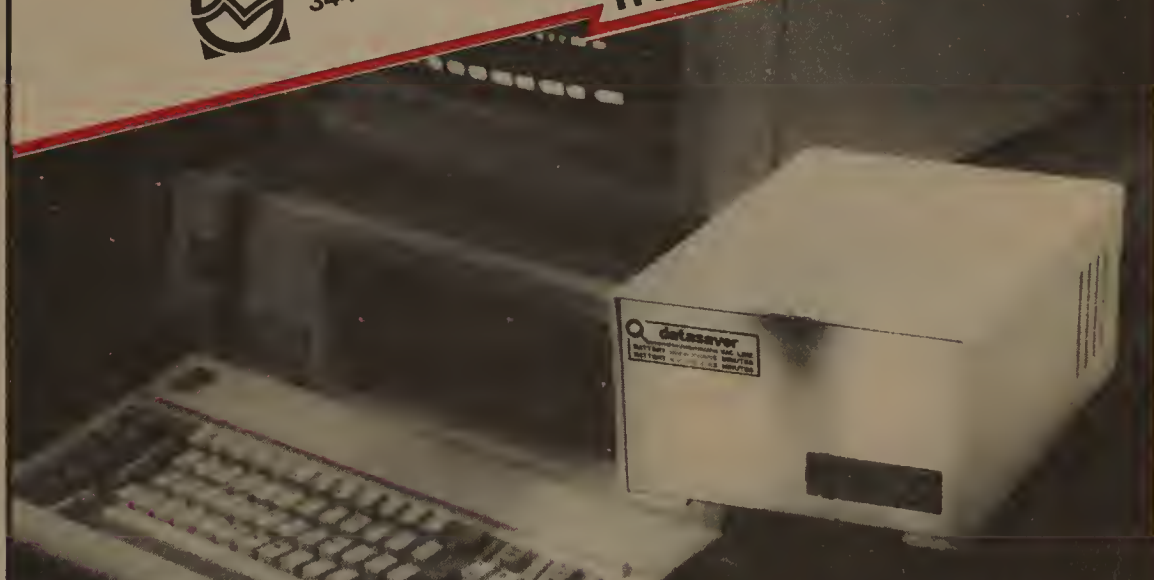
FEATURES - internal battery provides 5 min. + operating time - AC line conditioning
- audible and visual alarms, interrupt signal - compact, desktop styling
- no installation required.

200 WATT - \$695 / 90 WATT - \$395
IBM PC/XT PCjr.

Instant power order line
805-541-4161

CUESTA SYSTEMS, INC.
3440 Roberto Court, San Luis Obispo, California 93401

INSTANT AC POWER



Circle 50 on reader service card

EACH BY PRO...
YOU CAN PRO...
A CATALOG CAN CROSS...
SEVERAL REPORTS OR CROSS...
FILES BY DISKETTE OR BE MADE BY...
UNIQUE SEARCHES CAN BE MADE BY...
04-24-1984 17 FILES FORMAT 28 BYTES: 190464 USED

DISKETTE MANAGER

CHT@DATA.DAT COMMAND .COM CREATE
DM .EXE DMU .EXE DMUX
IDMBIO .COM IDMBOS .COM MENU
TEXT1 .BCR TEXT2 .BCR

.BCR CREATE2 .BCR DISKNAME.
.EXE FILEDATA.DAT FILEXREF.DAT
.BCR NAMEKEY .IDX REPORT .BCR

YOU CAN PRINT LABELS LIKE THIS ONE FOR ALL YOUR DISKETTES
DIRECTORY & STATUS INFORMATION IS AUTOMATICALLY READ FROM
EACH DISKETTE AND PRINTED ON THE LABEL.
YOU CAN PROVIDE UP TO 8 LINES OF COMMENTS SUCH AS THESE.
A CATALOG CAN HAVE 4000 ENTRIES REGARDING 200 DISKETTES.
SEVERAL REPORTS CAN BE GENERATED FROM THE CATALOG LISTING
FILES BY DISKETTE OR CROSS REFERENCING DISKETTES TO FILES
UNIQUE SEARCHES CAN BE MADE BY NAME, DATE, TIME, SIZE ETC
04-24-1984 17 FILES FORMAT 28 BYTES: 190464 USED 172032 FREE

TRIAL OFFER \$10

The Diskette Manager™ will help you make order out of chaos

Order the trial size Diskette Manager II™ for just \$10. You'll have all the powerful file management capabilities and the ability to produce 15 diskette labels like the one featured above. If you try it and like it, you can apply the \$10 toward the regular price of the Diskette Manager II™ (regular price \$99.95).

System Requirements: IBM PC, PC-XT or Compatible 128K, 80 Character display, monochrome or color. (The label printing feature requires an IBM or Epson dot matrix or equivalent printer.)

Uniform diskette labeling can save you hours of valuable time. Order your trial size Diskette Manager II™ today. All major credit cards accepted.

Lassen Software, Inc.™
468 Manzanita Ave., Suite 5
Chico, CA 95926
(916) 891-6957

It all adds up...

AST RESEARCH MEGA PLUS II

84K, C, S, ...	\$309.00
84K, C, 2S, ...	\$349.00
84K, C, S, P, ...	\$349.00
64K, C, S, P, GP, ...	\$389.00

COMBO PLUS II

84K, C, S, P, ...	\$279.00
---------------------	----------

I/O-PLUS II

C, S, ...	\$139.00
C, 2S, ...	\$189.00
C, S, P, ...	\$189.00
C, S, P, G, ...	\$199.00

SIXPAKPLUS

64K, C, S, P, ...	\$279.00
84K, C, S, P, G, ...	\$339.00

MAIN FRAME

AST-5251.....	\$699.00
AST-SNA.....	\$899.00
AST-BSC.....	\$899.00
AST-3870.....	\$749.00

MONOGRAPH PLUS

Video Board.....	CALL
------------------	------

QUADRAM

QUADLINK

84K Computer (Apple).....	\$479.00
---------------------------	----------

QUADBOARD

84K, C, S, P, ...	\$309.00
---------------------	----------

NEW EXPANDED QUADBOARD

84K, C, S, P, G, ...	\$319.00
------------------------	----------

QUADBOARD II

64K, C, 2S, ...	\$309.00
-------------------	----------

QUAD 512 + S7

64K, S, ...	\$259.00
---------------	----------

QUADCOLOR

Quadcolor I.....	\$239.00
Quadcolor II (640 x 200).....	\$449.00
Upgrade I-II.....	\$299.00

QUADDISK

6, 12, 20, 27, 72 Meg.....	starting at \$1799
----------------------------	--------------------

QUAD I/O

C, S, P, G, ...	\$199.00
-------------------	----------

CHRONOGRAPH

Clock/Calendar.....	\$89.99
---------------------	---------

PARALLEL BOARD

Printer Interface w/8' Cable.....	\$89.99
-----------------------------------	---------

QUADJET

QJ9000 Ink Jet Printer.....	\$749.00
-----------------------------	----------

MICROFAZER

Call for Configurations...P/P, P/S, S/S, S/P	
Starting at.....	\$159.00

EFAZER

Epson Internal Buffers

6K.....	\$89.99
64K.....	\$149.00

AMDEK

MAI.....	\$509.00
----------	----------

HERCULES

Monochrome Graphics.....	\$399.00
--------------------------	----------

EAGLE

PC Color Card.....	\$229.00
--------------------	----------

PARADISE

Multi-Display Card.....	\$449.00
-------------------------	----------

TAC

IRMA 3270.....	\$1049.00
----------------	-----------

PC PLUS PRODUCTS

Plantronics Color Plus.....	\$469.00
-----------------------------	----------

KOALA

Koala Pad w/Micro Painter.....	\$95.99
--------------------------------	---------

MICROSOFT

Multi-Tool Word w/Mouse.....	\$299.00
------------------------------	----------

MODEMS

ANCHOR

Volsmodem.....	\$59.99
Mark VI.....	\$169.00
Mark XII.....	\$299.00

HAYES

300.....	\$209.00
1200B.....	\$449.00
1200.....	\$499.00
SmartCom II.....	\$75.99
Chronograph.....	\$199.00

NOVATION

J Cat.....	\$99.99
PC Cat 1-2-3.....	\$399.00
Smart Cat 103.....	\$189.00
Smart Cat 103/212.....	\$439.00

MICROSTUF

Crosstalk XVI.....	\$105.00
Remote.....	\$99.99

MONITORS

AMDEK

300G.....	\$159.00
300A.....	\$169.00
310A.....	\$169.00
Color II Plus RGB.....	\$399.00
Color III RGB.....	\$329.00
Color 4 T-IBM RGB.....	\$419.00

BMC

1201.....	\$88.99
1201 Plus.....	\$98.99
9191 Color Plus.....	\$249.00

NEC

JB 1201 Green.....	\$149.00
JB 1205 Amber.....	\$159.00
JC 1215 Color.....	\$269.00
JC 1216 RGB.....	\$429.00

PRINCETON GRAPHICS

Max-12 Mono.....	\$199.00
HX-12 RGB.....	\$529.00

QUADRAM

8400 RGB.....	\$529.00
---------------	----------

TAXAN

100G Green.....	\$129.00
100A Amber.....	\$135.00
210 RGV.....	\$299.00
420 Hi-Res RGB.....	\$489.00

ZENITH

ZVM 123G Green.....	\$99.99
ZVM 122 Amber.....	\$199.99
ZVM 123 Green.....	\$89.99
ZVM 124 IBM Amber.....	\$149.00
ZVM 131 Color.....	\$309.00
ZVM 133 RGB.....	\$429.00
ZVM 135 RGB/Composite.....	\$469.00

DISK DRIVES

TANDON

5 1/4" 320K TM 100-2.....	\$219.00
---------------------------	----------

PERCOM HARD DRIVES

5 Meg w/Controller.....	\$1049.00
10 Meg w/Controller.....	\$1349.00
20 Meg w/Controller.....	\$1899.00

PRINTERS

BMC

BX-60.....	\$269.00
401.....	\$589.00

C.ITOH

8510P.....	\$379.00
A10P.....	\$569.00
F10-40P.....	\$999.00
F10-55P.....	\$1349.00

COMREX

Comwriter II.....	\$469.00
-------------------	----------

DAISYWRITER

2000.....	\$999.00
-----------	----------

DIABLO

620.....	\$949.00
630.....	\$1749.00

EPSON

RX80, RX80FT, RX100.....	CALL
FX80, FX100.....	CALL
LQ 1500.....	CALL

IDS

Prism 80/132.....	CALL
-------------------	------

JUKI

6100.....	\$499.00
-----------	----------

MANNESMANN TALLY

Spirit 80.....	\$319.00
160L.....	\$599.00
180L.....	\$849.00

NEC

8023.....	\$389.00
8025.....	\$869.00
2050.....	\$899.00
3550.....	\$1869.00
7730.....	\$1799.00

OKIDATA

82, 83, 84.....	CALL
92, 93, 2350, 2410.....	CALL

OLYMPIA

Compact 2.....	\$479.00
Compact R.O.....	\$509.00
ESW 3000.....	\$1449.00

SILVER REED

500.....	\$489.00
550.....	\$579.00
770.....	\$899.00

SMITH CORONA

TP-1000.....	\$399.00
--------------	----------

STAR GEMINI

10X.....	\$299.00
15X.....	\$399.00
Radix 10.....	\$599.00
Radix 15.....	\$899.00

TOSHIBA

1340.....	\$869.00
1351.....	\$1699.00

TRANSTAR

120P.....	\$499.00
130P.....	\$689.00
315 Color.....	\$499.00

COMPUTER MAIL ORDER

west

800-648-3311

In NV call (702)588-5654, Dept. 140
Order Status Number: 588-5654
P.O Box 6689
Stateline, NV 89449

canada

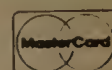
**Ontario/Quebec 800-268-3974
Other Provinces 800-268-4559**

In Toronto call
(416)828-0866, Dept. 140
Order Status Number 828-0866
2505 Dunwin Drive, Unit 3B
Mississauga, Ontario, Canada L5L1T1

east

800-233-8950

In PA call (717)327-9575, Dept. 140
Order Status Number: 327-9576
Customer Service Number: 327-1450
477 E 3rd St., Williamsport, PA 17701



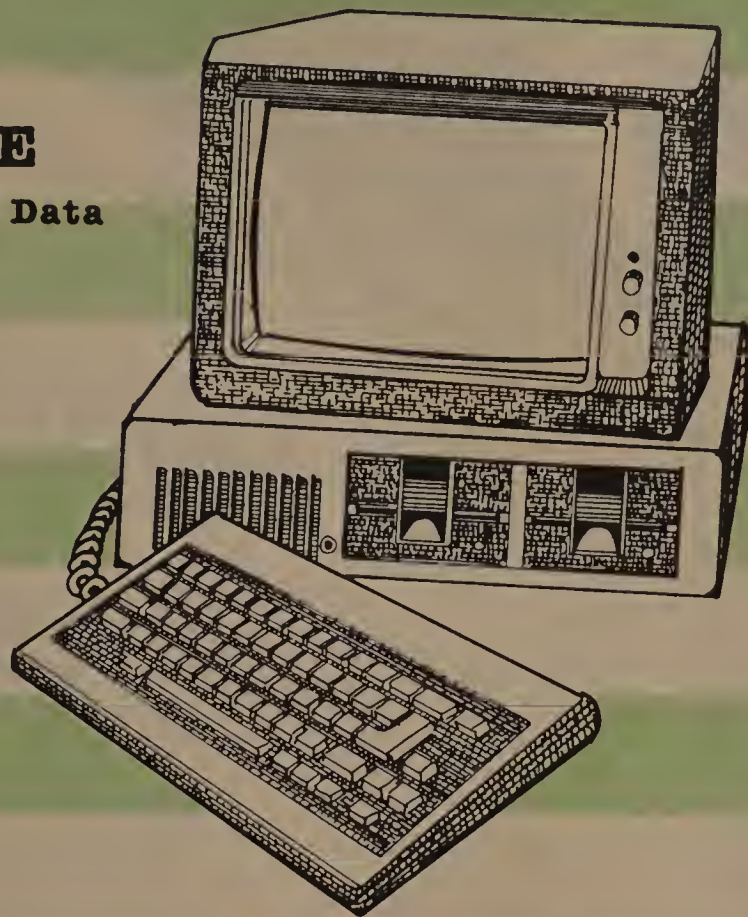
No risk, no deposit on C O D orders and no waiting period for certified checks or money orders. Add 3% (minimum \$5) shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. Call today for our catalog.

the best prices

CALL FOR YOUR FAVORITE PC/COMPATIBLE

Sanyo
TeleVideo
Zenith

Columbia Data
Compaq
Eagle



ASHTON-TATE

dBASE II	\$339.00
dBase III	\$449.00
Friday!	\$185.00
Bottom Line Strategist	\$269.00
Financial Planner	\$419.00
Framework	CALL

BenchMark

Word Processing	\$199.00
Mailing List	\$99.99

CDEX

Training Programs	each \$49.99
-------------------------	--------------

CONTINENTAL SOFTWARE

Home Accountant Plus	\$88.99
1st Class Mail	\$79.99

FOX & GELLER

OZZ	\$289.00
Grafox	\$199.00
dUtil	\$69.99
dGraph	\$199.00
Quickcode	\$199.00

IMSI

4 Point Graphics	\$139.00
Bisybase	\$189.00

IUS

EasyFiler	\$229.00
EasyPlanner	\$159.00
EasyWriter	\$119.00
EasyWriter II (spell/write/mail)	\$249.00

LEXISOFT

Spell Check	\$199.00
Spell Binder	\$259.00

LIFETREE SOFTWARE

Volkswriter	\$115.00
Volkswriter Deluxe	\$209.00

LOTUS

1-2-3	\$339.00
Symphony	\$549.00

MICROPRO

InfoStar	\$299.00
DataStar	\$179.00
Word Plus PC/The Boss	\$349.00
WordStar	\$299.00
MailMerge	\$159.00
WordStar/MailMerge	\$349.00
PRO PACK	\$379.00
SpellStar	\$159.00
CalcStar	\$99.99

MICROSOFT

Multi Plan	\$159.00
------------------	----------

SPINNAKER

Fraction Fever	\$29.99
Story Machine	\$29.99
KinderComp	\$24.99
Facemaker	\$29.99
Hey Diddle Diddle	\$24.99
Rhymes & Riddles	\$24.99
Snooper Troops 1 or 2	\$29.99
Search of Most Amazing Thing	\$29.99

INFOCOM

Witness	\$32.995
Enchanter	\$32.99
Planetfall	\$32.99
Suspended	\$32.99
Starcross	\$29.99
Zork 1, 2, or 3	\$29.99
Infidel	\$32.99

CENTRAL POINT

PC Copy II	\$32.99
------------------	---------

DISKETTES

MAXELL

MD-1	\$24.99
MD-2	\$34.99

VERBATIM

SS/DD	Value Life	\$26.99
DS/DD	Value Life	\$36.99

ELEPHANT

SS/SD	\$18.49
SS/DD	\$21.99
DS/DD	\$26.99

MULTIMATE INT.

Multi Mate	\$319.00
------------------	----------

PEACHTREE SOFTWARE

Peachtext 5000	\$229.00
Peachpack (GL/AP/AR)	\$219.00

PERFECT SOFTWARE

PerfectFiler	\$239.00
FinalWord	\$192.00
PerfectWriter	\$199.00
PerfectSpeller	\$119.00
PerfectCalc	\$119.00

PFS

File	\$89.99
Report	\$79.99
Graph	\$89.99
Write	\$89.99

SOFTWARE ARTS

TK Solver	\$189.00
-----------------	----------

SYNAPSE

File Manager Plus	\$89.99
-------------------------	---------

VISICORP

VisiCalc 4	\$159.00
VisiWord/Spell	\$199.00
VisiFile	\$199.00
VisiSchedule	\$199.00
Desktop Plan	\$199.00
Business Forecast Model	\$75.99
VisiTutor Word	\$59.99
Visi-On Calc	\$249.00
Visi-On Graph	\$129.00
Visi-On Word	\$249.00
Visi-On Mouse	\$159.00

COMPUTER MAIL ORDER

west

VISA
800-648-3311

In NV call (702)588-5654, Dept. 140
Order Status Number: 588-5654
P.O. Box 6689
Stateline, NV 89449

canada

Ontario/Quebec 800-268-3974
Other Provinces 800-268-4559

In Toronto call
(416)828-0866, Dept. 140
Order Status Number: 828-0866
2505 Dunwin Drive, Unit 3B
Mississauga, Ontario, Canada L5L1T1

east

800-233-8950

In PA call (717)327-9575, Dept. 140
Order Status Number: 327-9576
Customer Service Number: 327-1450
477 E. 3rd St., Williamsport, PA 17701

MasterCard

CANADIAN ORDERS: All prices are subject to shipping, tax and currency fluctuations. Call for exact pricing in Canada. INTERNATIONAL ORDERS: All orders placed with U.S. offices for delivery outside the Continental United States must be pre-paid by certified check only. Include 3% (minimum \$5) shipping and handling. EDUCATIONAL DISCOUNTS: Additional discounts are available to qualified Educational Institutions. APO & FPO Add 3% (minimum \$5) shipping and handling.

Circle 420 on reader service card



CRAFTSMEN OF THE NEW TECHNOLOGY.
BEST PRICES WITH QUALITY SUPPORT* ON SOFTWARE AND HARDWARE.

ORYX SYSTEMS

QUALITY DISCOUNTS

☞ Check Oryx's
New Ad Listings! ☞

SOFTWARE

Alpha Software

Data Base Manager II . \$ 179
Executive Package 105
Apple-IBM Connection . 169

American Internat'l Communications

Tlx-A-Syst \$ 199
Gram-A-Syst 199

Ashton-Tate

IBM/PC Reference
Encyclopedia \$ 55

ATI

All Training Programs . \$ 60

Autodesk

Autocad \$ 799

B&L

Multi-job (Runs nine
programs at once) . . . \$ 145

BPI

Personal Accounting . . \$ 139

d-BASE II CORNER

Anderson-Bell

Abstat \$ 299

Ashton-Tate

d-Base II \$ 389
FPL 410
Friday 179

Fox & Geller

Quick Code \$ 175
D Util 62

Human Soft

d-Base Plus \$ 90

Sensible Designs

D-Programmer \$ 199

Software Banc

d-Base II
User's Guide \$ 20
Advanced d-Base II
User's Guide \$ Call
Report Writing
w/d-Base II \$ 10

Tylog Systems

d-Base Window . . . \$ 179
d-Base Door \$ 109

*All above available
on PC-DOS

Cdex

All Training Prog's . . ea. \$ 52

Central Point

Copy II PC \$ 34

Compuview

Vedit CP/M 86 \$ 130
Vedit 130
Systran \$ 99

Continental Software

The Home Accountant . \$ 89
1st Class Mail 79
F.A.S.T. 75
Small Business Acc't . . 155
PC Combo Pak (Tax
Advntg/Home Acc't) . . \$ 169

Decision Resources

Chartmaster \$ 289

Digital Research

Concurrent CP/M 86 . . \$ 225
CP/M-86 \$ 39
Pascal MT+ 86
CP/M (w/SPP) \$ 375
Pascal MT+ (PC DOS) . . 385
C Basic 86 135
C Language/compiler . . 260
DR Graph 245
DR Logo \$ Call
Personal Basic 86 \$ 115
PL/1-86 499
Others \$ Call

Dow Jones

Market Analyzer \$ 215
Market Manager 189
Connector 39
Spreadsheet Link 159
Investment Evaluator . . 95

Eco-Soft

Microstat \$ 259

Emerging Technologies

Edix (editor) \$ 139
Wordix (formatter) . . . 139
Both 269

Enertronics

Energraphics \$ 265

Financier Inc.

Financier II \$ 119
Tax Series 105

Fox & Geller

Grafax \$ 199

Harvard Associates

PC Logo \$ 129

Harvard Software

Project Mgr. \$ 299

Hayes

Smartcom II \$ 89

Heritage

Smartkey II \$ 75
Smart Print 39
Smart Key/Print 105

Information Unlimited

Easywriter II System . . \$ Call
Easy Speller \$ Call
Easy Filer \$ Call
Accounting Module . . . \$ 350

STAR SOFTWARE SYSTEMS ACCOUNTING PARTNER

Easy to use menu-driven programs for the beginner that can be linked with a sophisticated system as needed.

Your "Partner" includes: general ledger, accounts receivable, accounts payable and payroll. Also included for a nominal fee is an "800" number for access to the Star Question Center Back-Up Support Unit.

ORYX PRICE \$ 289

Individual Software

Instructor \$ 35
Prof. DOS 47
Prof. Pixel 47
Tutorial Set 75

Innovative Software

T.I.M. IV \$ 275
Fast Graphs \$ 229

Lighthouse Software

Key II (Data Mgmt 1-2-3) \$ 149

Living Videotext

Think Tank (256K) \$ 139

MDBS, Inc.

Knowledge Man \$ 329

Micro Pro

WordStar \$ 265
Infostar \$ 265
Starburst \$ 149
Pak (WS/MWSS/Index) \$ Call

Micro Rim

@ Report Writer \$ 119
R:Base 299
R:Base Clout \$ Call

Microsoft

MuMath/MuSimp \$ 179
Pascal Comp (DOS) . . . 229
C Compiler (DOS) 309
Basic Compiler (DOS) . . 249
Multiplan MS/DOS 139
Word \$ 229
Word w/Mouse \$ 299
Others \$ Call

Microstuf

Crosstalk \$ 109

Mosaic/Graphic Software

Super Chartman II \$ 299
Super Chartman IV 199
Both II and IV 350
Integrated 6 369

Norell Data Systems

Systems Backup \$ 42

North American

Answer
(Database Prog.) \$ 159
Memory Shift 79

PC Jr.

Please call us
regarding products
for the IBM PC Jr.

Northwest Analytical

Stat Pak \$ 365

Norton-Lambert

Lync \$ 129

Oasis

The Word Plus \$ 110
Punc & Style 99

Open Systems

Acct'g Fitness Program . \$ 449

PC Software

PC Crayon \$ 36
Create-a-base 60

Peter Norton

Utilities \$ 55

PBL Corp.

The Personal Investor . . \$ 129



PEACHTREE CORNER

- ▶ PeachText 5000 Personal Productivity System.
Includes: PeachText Word Processor, Random
House Electronic Thesaurus, Spelling Proofreader,
PeachCalc Electronic Spreadsheet and List Mgr.
All of the above for only \$ 249
- ▶ PeachPak 4 (General Ledger, Accounts Receivable,
Accounts Payable) does not support hard disk . . . \$ 249
- ▶ Series 8 Accounting Mod. (each) \$ 449
- ▶ All other Peachtree Products \$ Call

Professional Software

WordPro Plus w/Bass . . \$ 339

Quarterdeck

"DESQ" \$ Call

Rossoft

ProKey 3.0 \$ 89

SPI

Open Access \$ 399

Satellite Software

Word Perfect w/ Sp . . . \$ 299
Others \$ Call

Softcraft

Fancy Fonts \$ 150

Software Arts

TK! Solver \$ 279
Applic Pkg for TK \$ 79

Software Publishing

PFS: Report \$ 79
PFS: File, Gr, Wrt 89
PFS: Access \$ 79

Softword/

Multimate Systems Inc.

Multimate (WP) \$ 275

Sorcim

Supercalc III \$ 239
Super Writer 169

Star Software

Legal Timekeeping,
Billing & Accts \$ 787
Accounting Partner . . . 289

Supersoft

Fartran IV PC/DOS
or 8086 \$ 279
8087 Support 40
Others \$ Call

Systems Plus

Landlord (prop mgmt) . . \$ 375
Runtime Basic 45

Visicorp

VisiCalc \$ 165
VisiSchedule 194
VisiWord 249
VisiOn \$ Call

Wang/Aspen

Grammatik \$ 60
Proofreader 42

GAMES

Automated Stimulation,
Armark, Avalon Hill,
Blue Chip, Broderbund,
Data Most, Infocom,
On Line, Spinnaker
Software, Sierra/On-Line,
Sublogic, Weekly
Reader \$ Call

Best Programs

@ PC Fixed Asset System . \$ Call

Bullish Investment

Net Worth \$ 225

BOARDS

AST Research

Six Pok Plus 64K (Ser, Por, Clk, exp to 384K) ..	\$ 279
MegoPlus 64K (CI/Col, Ser Port, 512K copcity w/Megopok)	\$ 269
Monograph Plus	\$ Coll
PC Net II Bus Syst	\$ Coll
CC-232 cord	\$ Coll
Extro ports for Mego-plus and I/O Plus II	
Game, Por & Ser	\$ 40
Megopok 256K expansion	\$ 325
I/O Plus II (CI/Col, Ser Port)	\$ Coll

Maynard Electronics

Floppy Dr Controller... \$ 160	
w/Par Port	209
w/Serial Port	219
Sondstor Floppy Dr Controller	\$ 194
Sondstor Memory Cord -3 modules cop. (OK) \$	145
Sondstor Multifunction Cord-6 modules cop. \$	79
Sondstor Modules	\$ Coll

Quadram

Quodboard 64K (Exp 384K CI/Col, Ser & Par Ports, Software) ..	\$ 279
Quodboard 384 (OK) ..	\$ 249
Microfozer Stock Printer Buffer (exp. to 512K)	
► Por/Por BK (exp 512K) \$	132
► Ser/Por BK (exp 64K only)	\$ 156
► Ser/Ser BK (exp 64K only)	\$ 156
Quodlink 64K Mem allows Apple S/W to run on IBM/PC	\$ 469
All Others	\$ Coll

PC NETWORKING

Orchid Technology	
Orchid Blossom (64K)	\$ Coll
PC net Dougherboard... \$	Coll
Add'l Products.....	Coll
Santa Clara	
Storter Kit	\$ 1,245
X Camp	
X Net (2 bds - 2 users)	\$ 799
X Net Exp Brd. Leo \$	429
Add'l Networking Products	\$ Coll

Rainbow Technologies

OK Writer Module (for Okidoto 83A, B2A) \$	99
Tecmar Products ...	\$ Coll

Xedex/Microlog

Boby Blue	\$ 325
Boby Blue II	\$ 525

MONITORS

Amdek Video 300A	
Amber	\$ 149
Amdek Color II + ...	\$ 425
NEC JB1201-12" Gr ...	\$ Coll
NEC JB1260-12" Gr ...	119
NEC JC1216 RGB	429
Panasonic	\$ Coll

JULY SPECIAL!

Panasonic

Monitor CT160 (Dual Mode) 10" w/ built-in audio, color composite graphics or B/W doti display. Direct-etched non-glore screen. Special Price

PGS HX12 RGB Clr ...	\$ Coll
PGS MAX 12	\$ 199

Quadram Quodchrome	\$ 475
Sanya B112-12HR Gr ..	\$ Coll

SONY

Profeel 12"	\$ Coll
Profeel 19"	\$ Coll
Profeel 25"	\$ Coll

Taxan

KG12N-UY 12" HR Am	\$ 139
KG12N 12" HR Gr	132
RGB Vision-1 12" LR Clr	\$ 323
RGB Vision-3 12" HR Clr	\$ 459
USI 1200A 12" HR Am	\$ 159

MODEMS

Hayes

Smartmodem 300	\$ Coll
Smartmodem 1200	\$ 499
Smartmodem 1200B (Int.)	\$ 439
Chronograph	\$ 189

Navation

PC Cot w/Crosstalk also known as Access 1-2-3 1200B ...	\$ Coll
---	---------

US Rabatics

Auto-Dial 300/1200 ...	\$ 459
Password	325
S-100	339

DISPLAY CARDS CORNER

Amdek MAI Cord . \$	420
Fredericks/Plan- tronics Colorplus... \$	Coll
Hercules Graphics Boord ... \$	359
MA Systems PC Peacock Clr Bd	\$ 325
Quadram Quodcolor I	\$ 199
Quodcolor II	389
Quodcolor II (upgrade)	\$ 210
Tecmar Graphic Master ... \$	499
USI Display Cord (clr/monochrome) ..	\$ 399

DISK DRIVES

CDC 1B00	\$ 229
Carana HD	\$ Coll
Carvus HD	\$ Coll
Davang 10/15/20MB HD	\$ Coll
Santa Clara HD	\$ Coll
Tandan TM-100-2	\$ 209
Vista Dynafome Systems w/ 5 to 40 MB Primory Disk Drive	\$ Coll

XEBEC

9710 10MB Hord Disk including host odopter ("Personality") and software to work on IBM/PC

HALF HIGHS

Matsushita	\$ 199
Panasonic	199
Shugart	225
Teac w/brockets	210

PRINTERS

Anadex	\$ Coll
IDS/Data Products	
Prism B0 w/4 options ...	\$ 1,399
Prism 132 w/4 options ..	1,547
Microprism	479
Diabla 630 ECS	\$ Coll
Diabla 630 API	\$ Coll
Epson	\$ Coll
Mannesmann Tally	
MT 1B0L	\$ 810
MT 160L	\$ 569
Spirit	\$ 315

NEC 3550	\$ 1,650
Okidata B2-93	\$ Coll

JULY SPECIAL!

Okidata 93 Printer

Print text, charts, graphs and illustrations on variety of forms. Friction or tractor feed forms up to 16" wide. Long-life head. MTBF

4000 hours

MTTR

15 minutes

Special Price

\$699

Quadram Quodjet ... \$ Coll

Siemens

Ink Jet Printers PTBB ... \$ 749

Silver Reed

Doisy Wheel \$ Coll |

Star Micranics \$ Coll |

Teletex T1014 \$ 469 |

Transtar

T-130-P/S \$ 665 |

T-315P Dot Matrix 489 |

T-120P/S 475 |

... and much more.

DISKETTES

BASF w/ librorcy cose ..	\$ 28
3M 5" DS DD Box ...	\$ 40
CDC	\$ 28
Maxell 5" DS DD MD2 Box	\$ 40
Spectrum 5 1/4" DS, DD (box/10) ..	\$ 29
Verbatim 5" DS DD Box	\$ 35
(3 Boxes Diskettes Minimum)	

PLOTTERS

Amdek	
DXY-100	\$ 599
Amplot II	\$ 899
Enter P100 Sweet P ...	\$ 545
Enter Six Shooter ...	\$ Coll
Haustan Instruments .	\$ Coll
Panasonic Digital Plotter VP6B01P	\$ 1,375

A variety of complete PC compatible systems are available at Oryx. For assistance in determining your needs, use our technical line.* We will be happy to provide full support.

Columbia
Hyperion

Corona
Televideo

MISC.

Alpha-Delta "MACC" surge protector	\$ 69
Curtis KB X-Tention	
Cable EC2	\$ 35
Mono X-Tention	
Cable EC1	\$ 45
UNI-1 Tilt/Swivel Ped-estol (ony monitor) \$	44
All Others	\$ Coll

Electronic Protection Devices

Surge Protectors..... \$ Coll

Flip 'n' File 5 1/4" \$ 22 |

Hauppauge

B0B7 Moth Pkg \$ 255 |

B7 Chip 159 |

Others \$ Coll |

Keytronic

Keyboard 5150 \$ 175 |

WP Keyboard KB5151.. \$ Coll

WP Keyboard

KB5151 Dvorak \$ Coll |

Kaala Technologies

Graphic Tablet \$ 95 |

Kraft Joystick \$ 45 |

Micrasoft Mouse \$ 155 |

Mause Systems

PC Mouse \$ 229 |

Street Electronics

Echo Speech Synth for IBM \$ 179 |

Echo Word \$ Coll |

TG Joystick \$ 49 |

Thunderware

Thunderclock \$ 126 |

Versa Computing

Versowriter \$ 239 |

SDI, Inc. STOPLOCK

Completely **STOPS** computer in boot mode — **LOCKS IT UP INTERNALLY.** **OPENS** only to valid user with I.D. code. (Check money-back guorantee by SDI, Inc.)

Policy:

- Wisconsin residents add 5% for sales tax.
- Add \$4.00 for shipping, handling and insurance per software.
- For multiple items, hardware or accessories add 2 1/2% for shipping, handling and insurance.
- 1/2% discount for cash payments.
- Foreign — add 15% handling & shipping for prepayment. (Int'l money order.)
- Prices are subject to change without notice.
- All items subject to availability.

ORYX SYSTEMS, INC.

CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961
Wausau, Wisconsin 54401

*For technical assistance, order status and in Wisconsin:
715-848-1374

Int'l Telex: 260181
ORYX SYS WAU

We Welcome:

- Visa, MasterCharge and American Express. (No charge for credit cards.)
- Corporate, government and educational accounts. (For additional discounting, please ask for special accounts desk.)
- COD (Add \$2.00 per shipment. Cash or certified check required.)
- Checks. (Allow 1-2 weeks for clearing.)

Working Hours:

Monday-Friday 8:30-6:00
Saturday 10:00-2:00
Central Time

ORDER TOLL FREE OUTSIDE WISCONSIN 1-800-826-1589



Product Index

Reader
Service
Number

Computers

- 764 American Micronics, Inc., 238
- 15 Articulate Computer, Inc., 192
- 748 IBM, 28-29
- 248 Seequa Computer Corporation, 123
- 701 Televideo, 16-17

Hardware

Boards

- 18 AST Research, Inc., IFC, 1
- 24 Bizcomp, 160-61
- 579 Datec, 325
- 699 Everex, 144-45
- Hercules Computer Technology, 23, 47
- 98 Maynard Electronics, 360
- 133 Orchid Technology, 91
- 107 PC Components, 71
- 243 Persyst, Inc., 62-63
- 468 Profit Systems, 65, 92
- 147 Pure Data Ltd., 256
- 605 Qubie' Distributing, 149
- 254 STB Systems, Inc., 315
- 261 Univation, 340
- 193 Ven-Tel, Inc., 15

Storage Devices

- 26 Chas-Moore, Inc., 316
- 643 Falcon Technology, Inc., 215
- 742 IDE Corporation, 38
- 683 Kamerman Labs, 36
- 537 Micro Design, 321
- 761 Micro Design Int'l, 80
- 475 Micro Tech Exports, 326
- 147 Pure Data Ltd., 256
- 605 Qubie Distributing, 125
- Santa Clara Systems, Inc., 268
- 169 Sigma Designs, Inc., 307
- 188 Tallgrass Technologies Corp., 18
- 261 Univation, 340

Monitors

- 296 Princeton Graphic Systems, 147
- 726 Taxan Corporation, 148

Reader
Service
Number

Printers, Plotters, and Typewriter Interfaces

- 344 Dataproducts, 78-79
- 685 DataSouth Computer Corporation, 86
- 67 Florida Data Corp., 227
- 349 Hewlett Packard/Plotter Division, 163
- 627 Juki America, 257
- 285 Toshiba America, Inc., 188-89

Communications

- 397 CXI, Inc., 364-IBC
- 462 Lockheed, 293
- 149 Quadram Corporation, 39
- 605 Qubie Distributing, 50-51

Miscellaneous

- 50 Cuesta Systems, Inc., 351
- Curtis Manufacturing Company, 73
- 113 General Electric Microwave Products Department, 241
- Microsoft, 2-3
- 753 Mindset Corporation, 176-77
- 605 Qubie Distributing, 89

Systems Software

Utilities

- 760 Borland International, 26-27
- 166 Coefficient Systems Corp., 174
- 270 Computer Control Systems, Inc., 318
- 765 DKI, 326
- 71 Fox & Geller, Inc., 127
- 74 Funk Software, 291
- 708 H.F. Computing Service, Inc., 236
- 573 Micro Focus, 207
- 133 Orchid Technology, 91
- 142 Persoft, Inc., 121
- 575 Photon Software, BC
- 766 Pyxell Applications, 318
- 673 Quaid Software Limited, 346
- 160 Rickerdata, 324
- 163 RTCS Corporation, 244
- 52 Softhelp, Inc., 102
- 174 Soft Right, 346
- 190 Tecmar, Inc., 198, 222-23
- 194 Vertex Systems, 157
- 698 Writing Consultants, 322

Reader
Service
Number

Languages

- 55 BMB Software Specialties, 325
- 406 Computer Innovations, Inc., 325
- 92 Lifeboat Associates, 269
- 231 Mark Williams Company, 115
- 100 MBP Software Systems Technology, 287
- Microsoft, 103
- 118 MicroWare, Inc., 320

Applications Software

General Business

- 772 Analex Computing, Inc., 146
- 658 Concentric Data Systems, 37
- 170 Software Strategies, Inc., 229

Financial & Spreadsheets

- 747 Barron Ross, 260
- 532 Future's Group, 326
- H & E Computronics, Inc., 25
- 409 Heritage Computing, Inc., 20
- 25 Prentice-Hall/Lumen Software, 175
- Software Services of Tampa, Inc., 162
- 647 Timberline Software, 19
- 704 Zylab/ General Business, 326

Job and Industry Specific

- 410 Softstyle, Inc., 316
- 182 Structural Programming, Inc., 236, 322

Data Management

- 354 CDI Information Systems, 194-95
- 51 Condor Computer, 228, 240
- 221 Hayes Microcomputer Products, Inc., 190-91
- Quest Research, Inc., 239

Word Processing/Text Editing

- IBM, 8-9
- 93 Lifetree Software, 173
- Multimate International, 278-79
- 533 Office Solutions, 53
- 399 Palantir, 245
- 165 Satellite Software International, 90

Reader
Service
Number

Communications

- 624 Inner Loop Software, 326
- 623 Lindbergh Systems, 143
- 682 Menlo Corp., 196-97
- 275 Microstuf, 270
- 133 Orchid Technology, 93
- 526 Software Link, Inc., 347
- 769 3Com Corporation, 180-81

Graphics

- 342 Decision Resources, 164
- 62 Digital Research, 48-49
- 71 Fox & Geller, Inc., 127
- 502 Graphic Communications, Inc., 24
- 530 IMSI, 157
- 332 MICROGRAFX, 35
- 138 Nicolet Computer Graphics Division, 310
- 506 Sam Wilson & Associates/Banner, 326

Integrated Systems

- 6 Alpha Software Corp., 12
- 741 Ashton-Tate, 126
- Innovative Software, 150-51
- 81 Martin Marietta/It Software, 111
- 119 Modtech/Lytron Systems, 237
- 175 Softrend, 76-77

Educational, Personal, Entertainment & Misc. Software

Educational

- 7 American Training International, 5
- 20 Creative Software, 87
- 589 Spectrum Holobyte, Inc., 14

Personal

- 710 Business Technotics, 266
- 321 Pacific Data Systems, Inc., 255
- 25 Prentice-Hall/Lumen Software, 175

Reader
Service
Number

Entertainment

- Bluebush Incorporated, 345
- 752 Silverman Associates, 324
- 589 Spectrum Holobyte, Inc., 14
- 308 subLOGIC Corporation, 104

Miscellaneous

- 758 Connecticut Software, 159
- Lassen Software, Inc., 351

General

Accessories

- 767 Attaché Software, Inc., 52
- 9 Bytes & Pieces, 324
- 276 Contemporary ComputerWear, 322
- 646 Control Data Corporation, 124
- 634 Creative Computer Products, 258
- 289 Dennison Computer Supplies, 226
- 578 Maxell, 166-67
- 576 Pacific Exchanges, 327

Services

- 31 Central Point Software, Inc., 225
- 362 Compuserve, 165, 193
- Preview Publishing, 40-41
- Safeware, 285

Books, Catalogs, and Periodicals

- Microsoft Press, 30
- 19 Prentice-Hall/General Publishing, 259

Mail Order

- 2 Advanced Computer Products, 323
- 205 Applied Computer Products, Inc., 178-79
- 90 Compuclassics, 289
- 273 Compumail, 214
- 754 Computer Discount Products, 306
- 420 Computer Mail Order, 352-53
- 626 Computers and More, 286
- 488 Connecticut Information Services, 254
- 554 Conroy La Pointe/Computer Exchange, 112-13

Reader
Service
Number

- 110 Creative Microsales, Inc., 314
- 58 Diamond Software, 114
- Disk World!, 327
- Diskette Connection, 325
- Economy Software, 282
- 214 800 Software, 309
- 768 47th Street Photo, 246-47
- 95 Logicsoft, Inc., 276
- 652 Macrotron Systems Corp., 327
- MC-P Applications, 288
- 108 Micro Flash Computer Systems, Inc., 305
- 386 Micro Management Systems, Inc., 324
- 112 Micro Mart, 122, 362-63
- 619 Micro Match, 327
- 681 Oryx Systems, 354-55
- 136 PC Connection, 128-131
- 242 PC Link Corp, 290
- 460 PC Network, 292
- 626 PC Pipeline, 326
- 274 Progressive Micro Distributors, 341
- 586 Ramware Software Products, 171
- 380 Rogue River Software, 320
- 185 Systems Mart, 326
- 705 Team Computer Products, 267
- 731 Wildcat Computing, 326
- Woodinville Computer Center, Inc., 348

The Product Index is published as a service to our advertisers and may be discontinued at the publisher's discretion. Every reasonable effort is made to categorize advertisers correctly. If a listing should be changed, please write us at PC World, 555 De Haro Street, San Francisco, CA 94107, so that we have the opportunity to change it.

Advertisers

Reader
Service
Number

Reader
Service
Number

Reader
Service
Number

- | | | |
|--|---|---|
| 2 Advanced Computer Products, 323 | 685 DataSouth Computer Corporation, 86 | 98 Maynard Electronics, 360 |
| 6 Alpha Software Corp., 12 | 579 Datec, 325 | 100 MBP Software Systems Technology, 287 |
| 764 American Micronics, Inc., 238 | 342 Decision Resources, 164 | MC-P Applications, 288 |
| 7 American Training International, 5 | 289 Dennison Computer Supplies, 226 | 682 Menlo Corp., 196-97 |
| 772 Analex Computing, Inc., 146 | 58 Diamond Software Supply, 114 | 537 Micro Design, 321 |
| 205 Applied Computer Products, Inc., 178-79 | 62 Digital Research, 48-49 | 761 Micro Design Int'l, 80 |
| 15 Articulate Computer, Inc., 192 | Disk World!, 327 | 108 Micro Flash Computer Systems, 305 |
| 741 Ashton-Tate, 126 | Diskette Connection, 325 | 573 Micro Focus, 207 |
| 18 AST Research, Inc., IFC, 1 | 765 DK1, 326 | 332 MICROGRAFX, 35 |
| 767 Attaché Software, Inc., 52 | Economy Software, 282 | 386 Micro Management Systems, Inc., 324 |
| 747 Barron Ross, 260 | 214 800 Software, 309 | 112 Micro Mart, 122, 362-63 |
| 24 Bizcomp, 160-61 | 699 Everex, 144-45 | 619 Micro Match, 327 |
| Bluebush Incorporated, 345 | 643 Falcon Technology, Inc., 215 | 275 Microstuf, 270 |
| 55 BMB Software Specialties, 325 | 67 Florida Data Corp., 227 | Microsoft Corporation, 2-3, 103, 105 |
| 760 Borland International, 26-27 | 768 47th Street Photo, 246-47 | Microsoft Press, 30 |
| 710 Business Technotics, 266 | 71 Fox & Geller, Inc., 127 | 292 Micro-Tax, 33 |
| 9 Bytes & Pieces, 324 | 74 Funk Software, 291 | 475 Micro Tech Exports, 326 |
| 354 CDI Information Systems, 194-95 | 532 Future's Group, 326 | 118 MicroWare, Inc., 320 |
| 31 Central Point Software, Inc., 225 | 113 General Electric Microwave Products Department, 241 | 753 Mindset Corporation, 176-77 |
| 26 Chas-Moore, Inc., 316 | 502 Graphic Communications, Inc., 24 | 119 Modtech/Lytron Systems, 237 |
| 166 Coefficient Systems Corp., 174 | 221 Hayes Microcomputer Products, Inc., 190-91 | Multimate International, 278-79 |
| 90 Compuclassics, 289 | H & E Computronics, Inc., 25 | 138 Nicolet Computer Graphics Division, 310 |
| 273 Compumail, 214 | Hercules Computer Technology, 23, 47 | 533 Office Solutions, 53 |
| 362 Compuserve, 165, 193 | 409 Heritage Computing, Inc., 20 | 133 Orchid Technology, 91, 93 |
| 270 Computer Control Systems, Inc., 318 | 349 Hewlett Packard/Plotter Division, 163 | 681 Oryx Systems, 354-55 |
| 754 Computer Discount Products, 306 | 708 H.F. Computing Service, Inc., 236 | 321 Pacific Data Systems, Inc., 255 |
| 406 Computer Innovations, 325 | 748 IBM, 28-29 | 576 Pacific Exchanges, 327 |
| 420 Computer Mail Order, 352-53 | IBM, 8-9 | 399 Palantir, 245 |
| 629 Computers and More, 286 | 742 IDE Corporation, 38 | 107 PC Components, 71 |
| 658 Concentric Data Systems, 37 | 530 IMSI, 157 | 136 PC Connection, 128-131 |
| 51 Condor Computer, 228, 240 | 624 Inner Loop Software, 326 | 242 PC Link Corp., 290 |
| 488 Connecticut Information Services, 254 | Innovative Software, 150-51 | 460 PC Network, 292 |
| 758 Connecticut Software, 159 | 627 Juki America, 257 | 626 PC Pipeline, 326 |
| 554 Conroy La Pointe/Computer Exchange, 112-13 | 683 Kamerman Labs, 36 | 142 Persoft, Inc., 121 |
| 276 Contemporary ComputerWear, 322 | Lassen Software, Inc., 351 | 243 Persyst, Inc., 62-63 |
| 646 Control Data Corporation, 124 | 92 Lifeboat Associates, 269 | 575 Photon Software, BC |
| 49 Corvus Systems, 88 | 93 Lifetree Software, 173 | 25 Prentice-Hall/Lumen Software, 175 |
| C.P. Aids, 361 | 623 Lindberge Systems, 143 | 19 Prentice-Hall/General Publishing, 259 |
| 634 Creative Computer Products, 258 | 462 Lockheed, 293 | Preview Publishing, 40-41 |
| 110 Créative Microsales, Inc., 314 | 95 Logisoft, Inc., 276 | 296 Princeton Graphic Systems, 147 |
| 20 Creative Software, 87 | 652 Macrotron Systems Corp., 327 | 468 Profit Systems, 65, 92 |
| 50 Cuesta Systems, Inc., 351 | 231 Mark Williams Company, 115 | 274 Progressive Micro Distributers, 341 |
| Curtis Manufacturing Company, 73 | 121 Markel Services, 322 | 147 Pure Data Ltd., 256 |
| 397 CXI, Inc., 364-IBC | 81 Martin Marietta/It Software, 111 | 766 Pyxell Applications, 318 |
| 718 Data Base Co., 327 | 578 Maxell, 166-67 | 149 Quadram Corporation, 10-11, 39 |
| 344 Dataproducts, 78-79 | | 673 Quaid Software Limited, 346 |

- 605 Qubie' Distributing, 50-51, 89,
125, 149
Quest Research, Inc., 239
- 586 Ramware Software Products, 171
- 160 Rickerdata, 324
- 380 Rogue River Software, 320
- 163 RTCS Corporation, 244
Safeware, 285
- 506 Sam Wilson & Associates/
Banner, 326
Santa Clara Systems, Inc., 268
- 165 Satellite Software International, 90
- 248 Seequa Computer Corp., 123
- 169 Sigma Designs, Inc., 307
- 752 Silverman Associates, 324
52 Softhelp, Inc., 102
- 744 SoftLogic Solutions, Inc., 277
- 175 Softrend, 76-77
- 174 Soft Right, 346
- 410 SoftStyle, Inc., 316
- 526 Software Link, Inc., 347
Software Services of Tampa,
Inc., 162
- 170 Software Strategies, Inc., 229
- 589 Spectrum Holobyte, Inc., 14
- 254 STB Systems, Inc., 315
- 182 Structural Programming, Inc., 236,
322
- 308 subLOGIC Corporation, 104
- 185 Systems Mart, 326
- 188 Tallgrass Technologies
Corporation, 18
- 726 Taxan Corporation, 148
- 705 Team Computer Products, 267
- 190 Tecmar, Inc., 198, 222-23
- 701 Televideo, 16-17
- 769 3Com Corporation, 180-81
- 647 Timberline Software, 19
- 285 Toshiba America, Inc., 188-89
- 261 Univation, 340
- 193 Ven-Tel, Inc., 15
- 194 Vertex Systems, 157
Western Union, 80-81
- 731 Wildcat Computing, 326
Woodinville Computer Center,
Inc., 348
- 698 Writing Consultants, 322
- 704 Zylab/General Business, 326

PC WORLD BACK ISSUES!

PC World is much more than a magazine; it's an incredible reference library for getting the very most out of your IBM-standard personal computer. Now you can complete that valuable reference set by ordering back issues of *PC World*. Within the U.S. and Canada, the cost is \$5 per copy for monthly issues and \$7 for the special *Software Review* issue. This price includes second-class postage. Please allow 4-6 weeks for delivery. For first-class delivery, please add \$3 per copy ordered. Outside the U.S. and Canada, the price (including first-class postage) is \$11 for monthly issues and \$15 for the *Software Review*. Sorry, we are unable to bill you or accept credit card orders for back issues.

To order: Check the issues you want below and enclose a check or money order with this form. Mail to: **PC World Back Issues, 555 De Haro Street, San Francisco, CA 94107**

Name _____

Company _____

Address _____

City/State/Zip _____

- | | |
|--|--|
| ☐ Vol. 1 No. 1
PC Compatibility | ☐ Vol. 1 No. 10
Ink Jet Printers |
| ☐ Vol. 1 No. 2
PC Portability | ☐ Vol. 2 No. 1
Artificial Intelligence |
| ☐ Vol. 1 No. 3
MS DOS 2.00, PC XT | ☐ Vol. 2 No. 2
PCjr Home Computing |
| ☐ Vol. 1 No. 4
Disk Emulation | ☐ Vol. 2 No. 3
Customizing
Spreadsheets |
| ☐ Vol. 1 No. 5
Communications
Programs | ☐ Vol. 2 No. 4
PC Compatibles |
| ☐ Vol. 1 No. 6
Hard Disks | ☐ Vol. 2 No. 5
PC Portability |
| ☐ Vol. 1 No. 7
Computer Aided
Design | ☐ Vol. 2 No. 6
Electronic Mail |
| ☐ Vol. 1 No. 8
Modems | ☐ Vol. 2 No. 7
Data Management |
| ☐ Vol. 1 No. 9 (\$7)
Annual Software
Review | ☐ Vol. 2 No. 8 (\$7)
Hardware Review |
| | ☐ Vol. 2 No. 9
Business Graphics |

NOW! Choose From 3 Hard Disc Drive Systems That Convert Your IBM* PC To Perform Like The PC XT!

Our Winchester Hard Disc Drive Systems offer 10 Mega-bytes of formatted capacity, are internally installed and use available power!

Maynard Electronics introduces three Winchester Hard Disc Drive Systems — the only drive systems to offer you 10 Mega-bytes of formatted capacity with complete internal installation! These systems offer the user countless benefits and features: capability of booting off the hard disc; additional functions while requiring only **one** card slot in your PC; and, use of available power, thereby preventing overheating problems which have affected other drives. Handling heavyweight data was never easier.

All three systems are quality engineered and work with DOS

2.0 without any special software drivers and also run with other operating systems designed to make use of the XT hard drive system. All you need is the IBM* DOS 2.0 Manual and you're ready to run!

Each system is equipped with a low-power hard disc drive, complete software, cable, a SandStar™ Card and Hard Disc Controller Module. SandStar™ is the first family of modular peripherals created for the IBM* PC. Simple instructions for easy installation are included and all components are backed by an Unconditional One Year Parts and Labor Guarantee.

WS 1

This System is equipped with the SandStar™ Multi-function card. In addition to the Hard Disc Controller Module, you can add up to three other SandStar™ Modules while using only **one** card slot. The following modules are available: Serial Port, Parallel Port, Clock Calendar, Game Adaptor, and Prototyping Module.

WS 2

This System is equipped with the SandStar™ Floppy Drive Controller Card. The Card can control, in addition to the Hard Disc Drive, two floppy drives mounted inside your PC and optionally two additional 5¼" or 8" drives mounted externally. This leaves three system slots for other expansion boards.

WS 3

This System is equipped with the SandStar™ Memory Card. In addition to controlling the Hard Disc Drive, the Memory Card allows you to add 64K bytes to 576K bytes of memory using only one card slot.

To expand your PC to perform like the PC XT, one of our Winchester Hard Disc Drive Systems is right for you. And if you have already made the wise decision to install any of Maynard's SandStar™ Cards, the SandStar™ Hard Disc Controller Module may be purchased separately.

TO ORDER, CONTACT YOUR LOCAL DEALER OR DISTRIBUTOR.



We make modern times better.

MAYNARD
400 East Semoran Blvd.
Casselberry, Florida 32707
305/331-6402

ELECTRONICS

NOW!
Compatible
with
COMPAQ!**

*IBM is a trademark of the International Business Machines Corporation
**COMPAQ is a trademark of the COMPAQ Computer Corporation.

You Spend A Lot Of Time Looking For Breaks For Your Tax Clients. Now Look At One For You.

CPAids has the professional tax programs you need to cut through your workload in record time.

Our Master Tax, Standard Tax, Corporate 1120 and Tax Planner give you all the tools necessary for fast, efficient tax return processing and tax planning.

Our new Client Write-Up software includes a flexible report generator and is completely interactive with our Master Tax Program and Corporate 1120 to generate Schedule C.

All CPAids software is operational with IBM* and IBM compatibles using PC-DOS* or MS-DOS*. Also compatible with DEC Rainbow* and many other CP/M* operating systems.

CPAids software has been developed under the supervision of Andy Rosenberg, CPA and noted tax authority. It is this professional daily involvement with tax accounting that separates CPAids software packages from the rest.

Want to learn more? CPAids makes that easy, too. Demo disks are available at only \$55 each. And, demo disk charges will be applied against programs purchased.

Call or write for more information and the name of the dealer nearest you.

**Trusted by Accounting
Professionals since 1978**

FORMS	STANDARD TAX PROGRAM \$995.	MASTER TAX PROGRAM \$1,795.
1040 Pgs. 1&2	X	X
A,B,C,D,E,F,G	X	X
R/RP, SE, W, ES	X	X
1116		X
2106, 2119, 2210	X	X
2441	X	X
2555, 3903F		X
3468	X	X
3903	X	X
4137		X
4136	X	X
4255	X	X
4562	X	X
4684	X	X
4797	X	X
4835		X
4952		X
4972, 5884	X	X
5695	X	X
6251	X	X
6252	X	X
MULT C,E,F,2106, 6252		X
WORD PROCESSING		X
PRINT Substitute forms, Overlays, Continuous Pre-printed, Single Sheet	X	X
INTEGRATED STATE RETURNS	X	X
INTERFACE WITH CLIENT WRITE-UP	X	X
OVERFLOW SCHEDULING		X
INTERFACE WITH TAX PLANNER	X	X
DATA ENTRY	BATCH	INTERACTIVE
PROFORMA	X	X
ON LINE HELP		X
MODEM SUPPORT	OPTIONAL	X
Annual updates at 1/3 of current price		



CPAIDS®

1061 Fraternity Circle Drive • Kent, Ohio 44240 (216) 678-9015

*CP/M is a Trademark of Digital Research, Inc. DEC Rainbow is a Trademark of Digital Equipment Corp. MS-DOS is a Trademark of Microsoft Corp. IBM and PC-DOS are Trademarks of International Business Machines Corporation.

floppy disk drives

TANDON TM 100-2 FULLY IBM PC COMPATIBLE
CALL FOR QUANTITY PRICING

\$209

½ HT. DISK DRIVES TOP NAMES
SOUTH'S LARGEST SUPPLY • DEALER INQUIRIES INVITED

\$179

networking/protocol conversion

PCnetPlus, PC Turbo BY ORCHID

ORCHID TECH'S NEW, COMPLETE PRODUCT LINE

IRMA "STILL A BEAUTY" REPLACES 3278's WITH PC's /IRMA LINE

BLUE LYNX 5251/3276 EMULATOR

printers

AMDEK AMPLOT II Supports LOTUS 1-2-3 Graphics **\$799**
Houst. Inst. Plotters & Digitizer.. **CALL!**

DOT MATRIX

EPSON FX80 & 100 (160 cps) Best Price!

EPSON RX80T or F/T Best Price!

EPSON RX80 & 100 Best Price!

EPSON LQ 1500 NEW! Letter Quality in a Dot Matrix Best Price!

Mannesman Tally Spirit 80 **\$289**

Prowriter/MicroPrism 80 **\$275**

Prism Color IBM's Choice for LESS, 132 Col (200 cps) Color Graphics **\$1495**

OKIDATA 92&93 Opt IBM Proms 160 cps Best Price!

OKIDATA ML84 200 cps Best Price!

OKIDATA 2410 Pacemark (350 cps) Best Price!

TOSHIBA P-1351 & 1340 Best Price!

GEMINI 10X & 15X **\$285/\$425**

T.I. 855 24 WIRE PIN HEAD, NOW IN STOCK! Best Price!

NEC P2 & P3 180 cps Best Price!

DIABLO P38 (400 CPS) **\$1725**

LETTER QUALITY

NEC SPINWRITERS 2050, 3550 & 7730 Best Price!

DIABLO 630 ECS for PC **\$1845**

DIABLO 620, 630 API New Low Prices!

C-ITOH Starwriter (40 cps) Printmaster (55 cps) **\$1055/\$1455**

QUME SPRINT 11 40 PLUS SPRINT 11 55 PLUS Best Price!

BROTHER HR15 & HR25 **\$449/\$695**

LQ Feeders Great Cut Sheet Feeders for NEC 3550 & C ITOH Starwriter **SAVE!**

chips

CALL FOR QUOTE ON QUANTITY CHIP PURCHASES

INTEL 8087 High Speed Math Coprocessor **\$175**

64K RAMCHIPS **\$55/\$159**

64k 9 Chip Upgrade Kit (192K 27 Chip Upgrade Kit)

All advertised cash prices subject to change without notice

PCterminal LO COST Terminal W Built in LAN & Processors • Serial and Parallel Ports • Four Open Slots

SNA & BLSYNC • 3780, 5251, 3274

hard disks

Peachtree

Peripherals

P-10

Industry's Best Buy • 10 Meg/F. Auto Boot • Runs W/OUT Ext. Power Internal or External Installation

SYSGEN 10 & 20 MEG F W Streamer Tape Faster Streaming & Formatting **CALL!**

IOMEGA Bernoulli Box • 10 MEG Removable Cartridges • Single or Double Drive **\$2795**

DAVONG 10 MEG/F 15, 21, 35 Available External **\$1575**

SYSGEN IMAGE Streamer Tape Back Up For Your IBM XT **CALL!**

ALL NAME BRANDS AVAILABLE NOW! BEST PRICES!!
IF YOU DON'T SEE IT— **CALL!**

multifunction boards

#1-384K 64 384K • Clock Ser & Par Pts Ram Disk • Spooler • Opt Game Pt Best Price!

#1-MultiCard Max: 8 Func (64-512K) W/Opt. Game Pt. Best Price!

#1-I/O Card Ser. Clk. Spooler Ram Disk (Opt 2nd Ser, Par & Game) Best Price!

QUADBOARD New Version 64-384K **\$279/\$549**

CAPTAIN 64-384K **\$269**

SEATTLE RAM + 3 0-256K • Ser • Par Flash Disk • Clk • Spooler **\$199**

J-RAM II 512K Multifunction **CALL!**

PROFIT Systems 64-512K RAM Plus & Elite **\$299/\$680**

BABY BLUE II 64-256K • 2808 • Par • 2 Ser • Clk RAMdisk • Spooler • Extra Software . . Best Price!

PC Blossom ORCHID's 6-Pak Clone with Optional PCnet Piggy Back **\$275**

MAYNARD SANDSTAR Floppy & Hard Disk Controller Cards . . Best Price!

monitors

PGS-MAX 12 Amber • Runs off IBM Mono Card • 720h x 350v Best Price!

PGS SR-12 690x480 • Non-Interlaced Mode RGB W/HiRes Text, W/Color Card . . . Best Price!

PGS-HX 12 HiRes 690 Dot RGB Best Price!

QUADCHROME HiRes RGB Best Price!

AMDEK COLOR II+ **\$399**

AMDEK COLOR IV 720 Dot **\$579**

AMDEK 300 A/300G 12" **\$149/\$139**

AMDEK 310A Amber 12" Improved Alternate to IBM Green Screen **\$175**



Open Access

Spreadsheet, 3-D Graphics,
Word Processor, Time Manager
& Communications in One Pkg.

\$349!

- JACK 2** Integrated Word Processing, Spread Sheet, Data Base Management, Chart on One Screen **\$299**
- Decision Manager** All New Integrated Software by Peachtree **CALL!**
- VisiOn** Applications Manager Calc • Word • Graph • Query **CALL!**
- KEY II 1-2-3** Outstanding Utility for LOTUS Unlocks Information Management **\$159**
- SuperCalc³** World's Most Usable Spreadsheet Superior Graphics to LOTUS **\$239**
- Lattice C-Compiler** Version 2.0 Supports One Meg RAM on PC **\$299**
- MICROSOFT COMPILERS** **CALL!**
- DIGITAL RESEARCH COMPILERS** **CALL!**
- Norton Utilities** A Must for Every IBM PC **\$59**
- ProKey 3.0** RoseSoft **\$95**
- CROSSTALK XVI** MICROSTUF **CALL!**
- SMARTCOM II** Hayes **\$99**
- FINANCIER II** Personal Series **\$119**
- Dow Jones** Full Line, Now W/Full Acct'ing, Comm. & Sales Planning Joining Fine Stock Mkt. Pkg's. **CALL!**
- IUS** A.R., A.P., G.L., Inventory, Order Entry, Payroll **\$299**
- Peachtree Accounting** **CALL!**
- Open Systems** A.R., A.P., G.L., Payroll, Job Cost, Inventory, Order Processing **CALL!**
- Multilink** Multi User, Multi Tasking Package Supports Up to 8 Dumb Terminals off IBM PC **CALL!**
- Set-FX PLUS** NEW! Epson FX Series Control Pkg. **\$45**
- Sideways** Inverts Printout **\$49**
- ATI Training** Critics Choice Software Tutorials **\$49**

modems

- HAYES** SMARTMODEM 300, 1200 & 1200B **CALL!**
- NOVATION** Entire Line of Value-Packed MICRO MODEMS Inc. Access 1-2-3, the Internal w/Crosstalk XVI. **\$99**
- RIXON** 1200-4800 BAUD • IBM PC Compatible **CALL!**
- Signalman Mark XII** 300-1200 Direct Connect Quality at a Low, Low Price **\$259**

graphic cards

- HERCULES** Monochrome Graphics Supports LOTUS 1-2-3 **CALL!**
- PLANTRONICS Color +** Biplaner, Super Hi/Res With Color Magic **CALL!**
- Graphics Master** Tecmar-Color & Mono Graphics Supporting Lotus **Low Price!**
- QUADCOLOR I & II** **CALL!**
- Paradise Sys.** Color Graphics/Monochrome Parallel Printer Port **\$379**
- STB** Graphix Plus Color & Mono Graphic • Par. Port RAM Disk • Spooler • Lita Pan Port • Opt. Clk/Cal **CALL!**
- Multigraph** 132 Col in Mono W/Graphics 720h x 350v Color Graphics to 640h x 400v • Opt. Par. Port **\$375**
- Amdek MAI** Color Graphics/Monochrome/Par./Prt. Port/8 Pages Storage/HALO/Light Pen Port-Super W/Color IV **\$345**

Atlanta, Charlotte, Washington D.C., Tampa, Ft. Lauderdale, Orlando, Louisville

- HARVARD PROJECT MANAGER** NEW **CALL!**
- Infoscope** New Data Base from Microstuf. Critically Acclaimed!! **CALL!**
- R:base 4000 or 6000** Report Writer & Clout Microrim **\$329**
- Power-base** GMS Systems • Combination of Relational & Hierarchical Data Base **CALL!**
- Knowledge Man** Ver. 1.06 Now Available for this Highly Acclaimed Data Base **\$295**
- dBasell** NEW! "C" Language Easy to Use and Ultra Fast **CALL!**
- dBasell** Ashton Tate **\$389**
- MultiMate** 3.22 "WANG" Style Word Processor With Spelling Checker **\$279**
- PFS** Write, File, Report, Graph, Solutions, Access **\$99**
- Microsoft Word** W/Mouse • Fourth Generation Word Processor • Use Up to 8 Windows **CALL!**
- VOLKSWRITER DELUXE** **\$189**
- WordStar ProPak** Now W/Free Tutor! CorrectStar, MailMerge **CALL!**
- WORDPLUS-PC** With the "BOSS" Integrated, Spell, Check Plus Mailmerge **CALL!**
- WordPerfect SSI** Available Now by Popular Demand **\$299**
- Easy Writer II** System Includes Speller & Mailer **\$219**
- Peach Text 5000** **\$199**
- FRIDAY!** Ashton Tate **\$195**
- QUICKCODE/dGraph/dUtil** **CALL!**
- PC Paint Brush** Amazing Mousa Drive Graphics W/Screen Dump Utility **\$139**
- Chart-Master/Sign-Master** **CALL!**
- "CAD Systems"** Best Selection Available of Computer Aided Design Graphics **CALL!**
- ENERGRAPHICS** Hot New Graphics Packaga **\$269**
- Copyll PC** **\$35**

miscellaneous

- Keytronics 5151** New Improved **CALL!**
- MOUSE** Optical Type LOTUS & VisiOn Compatible By Mouse Systems **\$209**
- CURTIS** Monitor Pedestal Keyboard Extension Cable, Monitor Extension Caba **CALL!**
- MICROFAZER** (8K-128K) Stack Spooler **\$139**
- BACK UP Power Supply** 200/425/625 Watts **CALL!**
- ISOBAR** Surge Protectors • With Great Filtering Via Isolated Outlet Pairing • 4 & 8 Plug **\$55**

ORDERS ONLY

1-800-241-8149

Monday-Friday 9:00 AM-10:00 PM; Saturday 9:00 AM-5:00 PM

MICRO MART™

TECHNOLOGY CORPORATE CAMPUS

3159 Campus Drive • Norcross, GA 30071

For Information

1-404-449-8089

Technical Support

1-404-446-3836

Telex

880497

MIS MANAGER

Finally, a micro-to-mainframe connection for the one person in the company who really needs it.

Most micro-to-mainframe solutions seem to favor the micro over the mainframe.

Not at CXI.

We look at the problem from your side. Because long before we opened our doors, we were working long hours in the DP departments at IBM, National Advanced Systems, Control Data, Memorex, Fairchild and other companies.

So we've dealt with the same problems you're facing today. Security. Resource sharing. Applications backlog. And, most important, how to keep your network under control.

Like you, we understand there's more to PC-to-host communication than simply plugging in a board.

Which is why we've come up with sophisticated hardware and software products that solve problems at both ends.

To begin with, there's our high performance PCOX™ Personal Computer Coaxial Interface. It turns an IBM PC*, PCXT* or IBM-compatible computer into a 3278 or 3279 terminal.

Its high-speed Professional Workstation

Facility software lets you quickly transfer files to and from the host. So you can take full advantage of the PC's processing capabilities. While keeping connect time to a minimum.

To reduce your applications backlog, we offer m3278/SPF™ software with our PCOX interface. It works just like the host's SPF. Only at the PC level. So your programmers can work off-line. And free up the mainframe for other users.

Finally, there's CONNEWS™. Our unique host system software program that presents IBM host applications in an easy-to-understand menu. Which means now you can spend less time explaining how to use your network. And more time improving it.

We offer a 30-day free trial on all our products. So for more details or for the name and number of your nearest distributor, call us toll-free at 800/221-6402. In California, call 415/424-0700.

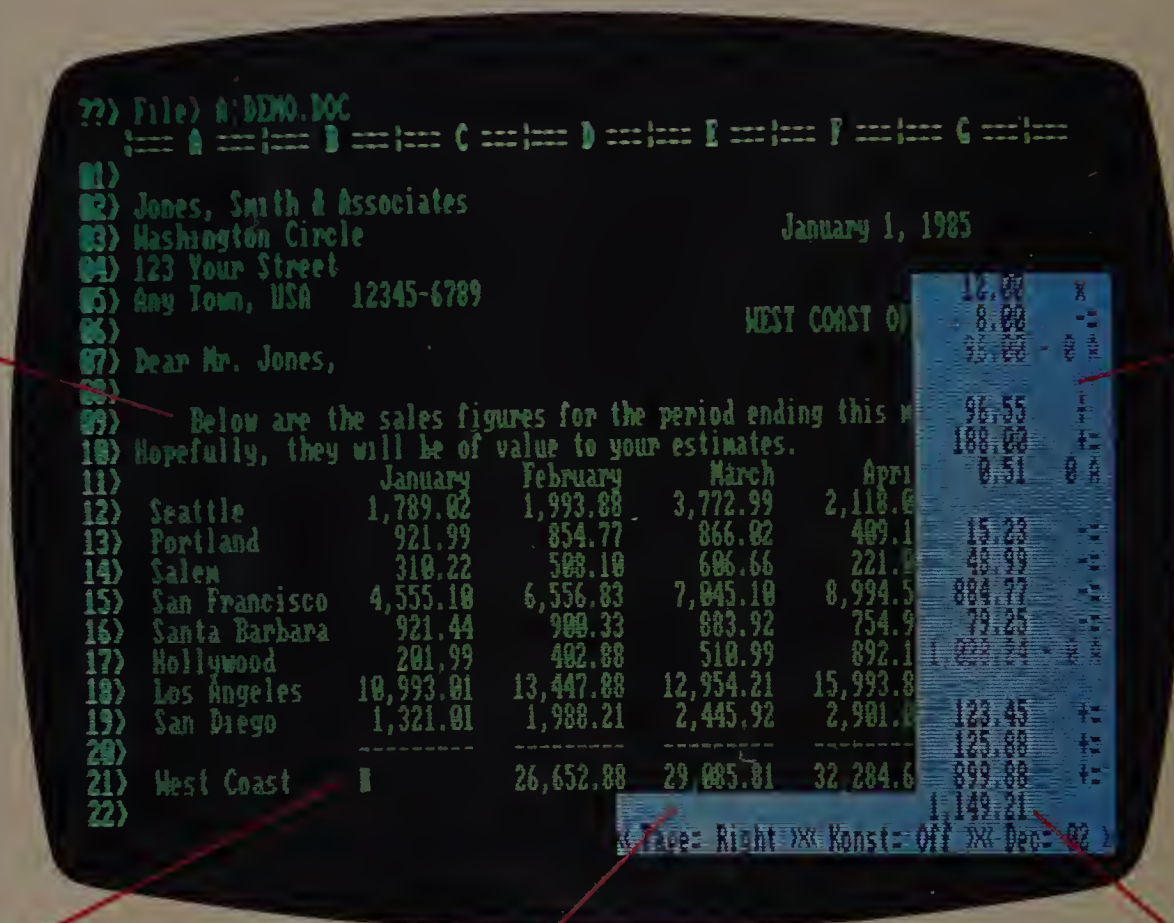
And connect with the right people.

CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303



We Interrupt this Program to bring you a Special Calculator

INSTANTLY
FREEZES
PROGRAM
TO DO
CALCULATIONS



TAPE
DISPLAY
FOR
CHECKING
FIGURES

TRANSFER TOTALS
INTO YOUR PROGRAM

WINDOWS OVER
ANY PROGRAM
ANYTIME

15 DIGITS
MEANS CALCULATIONS
TO 9 TRILLION

Tenkey is an instant business calculator program that you can use during any other application.

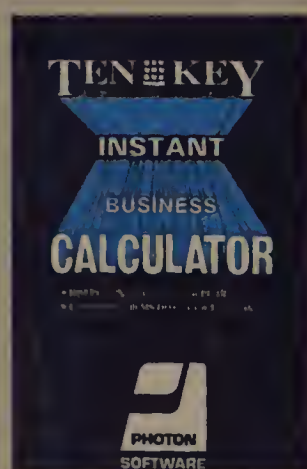
A simple keystroke, instantly freezes your current program and opens a calculator window on the screen. Your 10-key pad now does the job of a desktop accounting calculator. Press another key and your program is running again. You can even post the Tenkey total back into your current program!

Tenkey has all the standard business calculator features. Percent, constant and memory keys. 15 digit entry. Even a

tape display for double checking your figures.

Imagine! An integrated calculator that posts figures directly to payrolls, spread sheets, word processors and other programs. Just press a key and it's there. You'll save time in every step of your business computing. It's that powerful.

Now for the best part . . . Tenkey is only \$49.95, complete with an interactive tutorial. At computer stores everywhere. Stop in for a demo, then buy two. One for business and one for you.



TEN KEY
THE ORIGINAL COMPUTER CALCULATOR



PHOTON SOFTWARE
P.O. BOX 1408
BELLEVUE, WA 98009
U.S.A.
(206) 451-8272

For IBM-PC and compatibles

Circle 575 on reader service card